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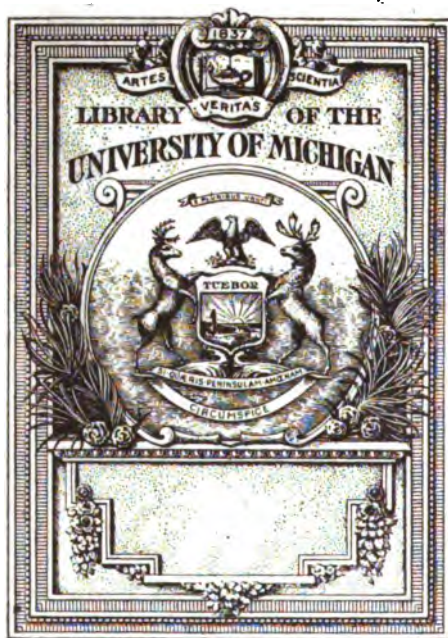
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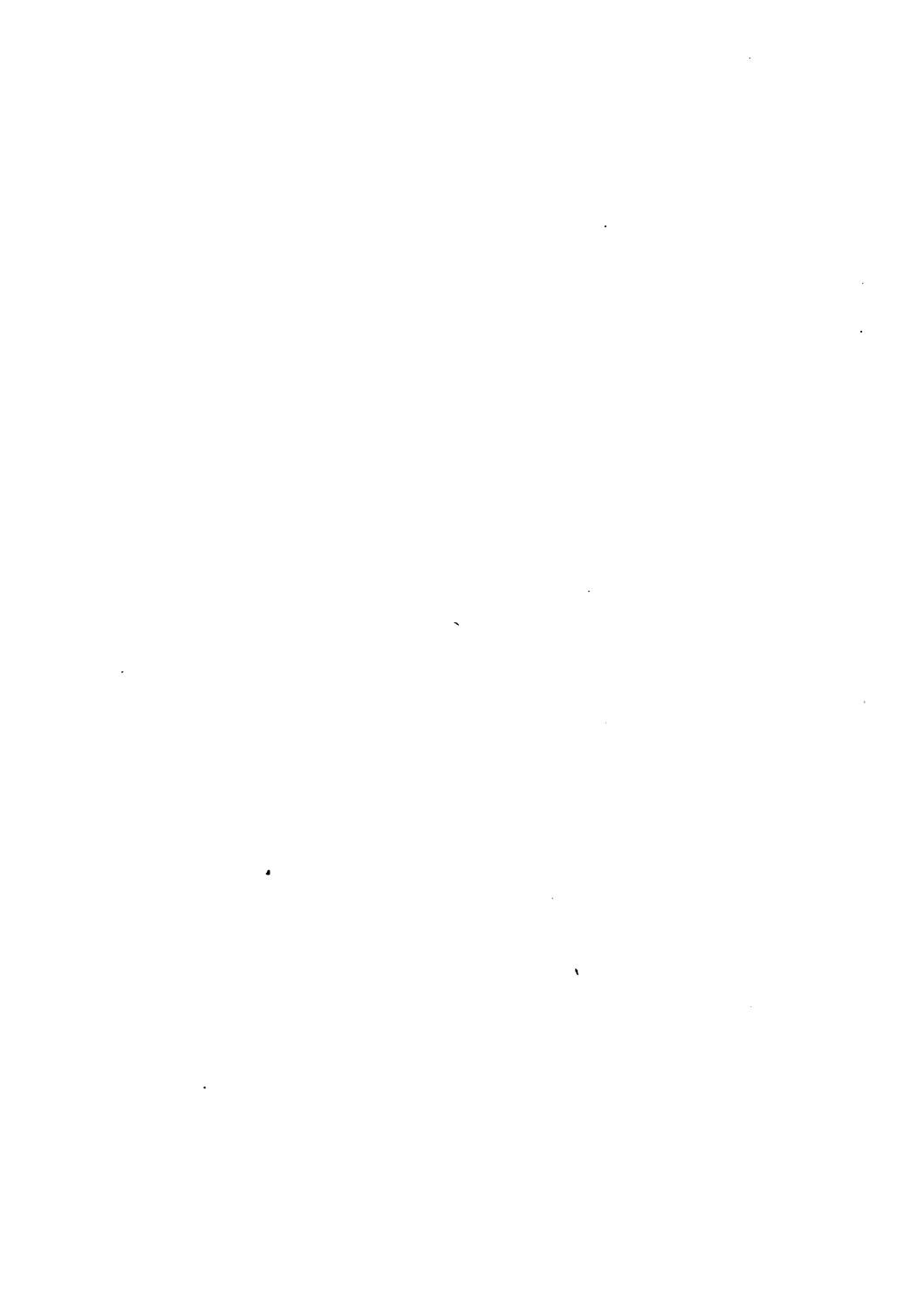
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Margaret M. Wether



AROUND THE YEAR IN THE GARDEN



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Every home should have a garden! In the vegetable plot there is better living and good exercise. Among the flower plots there is inspiration and recreation. In all—"the golden hours that bring both health and joy."

AROUND THE YEAR IN THE GARDEN

A SEASONABLE GUIDE AND REMINDER FOR
WORK WITH VEGETABLES, FRUITS, AND
FLOWERS, AND UNDER GLASS

BY

FREDERICK FRYE ROCKWELL

AUTHOR OF "HOME VEGETABLE GARDENING," "GARDENING
INDOORS AND UNDER GLASS," "THE KEY TO
THE LAND," ETC.

ILLUSTRATED WITH PHOTOGRAPHS BY THE AUTHOR AND
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New York

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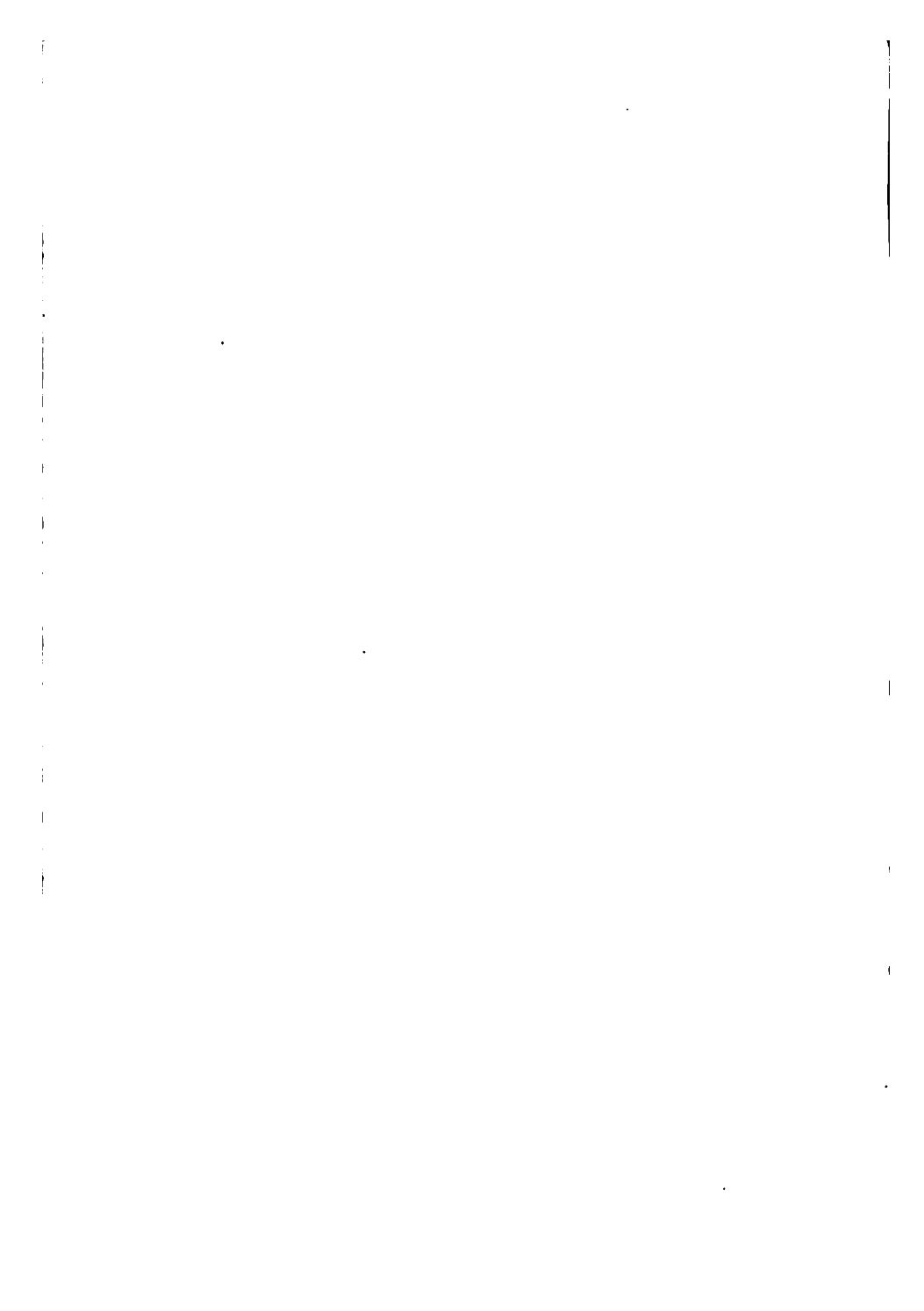
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**Fraternally
DEDICATED
TO THAT GOOD FELLOWSHIP OF GARDENERS
WHO, TILLING THEIR OWN SMALL PLOTS,
INCREASE THE EARTH'S BOUNTY AND BEAUTY.**

9-56-29, 1916.

330403



INVITATION

In golden April weather,
In sun and wind and rain,
Let us fare forth and follow
Beneath the spring's first swallow
By budding break and heather
To the good brown soil again!

With rake and seeds and sower,
And hoe and line and reel,
When the meadows shrill with "peeping"
And the old world wakes from sleeping,
Who wouldn't be a grower
That has any heart to feel?

Delve in! The year's before us;
Spring's promise fills the air.
Descendants of Antæus,
The brown earth's touch can free us,
Renew us and restore us,
From the hand o' carking care.

Work, through the summer golden,
And through the autumn's glow,
Till the months lay down their burden
In the full garden's guerdon,
And earth, once more enfolden,
Sleeps warm beneath the snow.

And for our work—though showers
And autumn frosts destroy—
Our greatest pay's not measured
In fruit and flower we've treasured,
But in the golden hours
That brought us health and joy!

FOREWORD

This book is designed for the busy man or woman whose spare time available for gardening is limited, and who, consequently, is interested in utilizing every hour to the best purpose. Seasonable and definite directions are given for the various tasks encountered in caring for the garden and grounds on the moderate sized place, where the services of a professional gardener are lacking. On the other hand, piece-meal and didactic directions, and "calendar gardening," have been avoided. The dates mentioned in connection with the chapters are for the convenience of the reader, as indicating when the work described should be given attention, or can be done to the greatest advantage,—in most instances well in advance of the time for actually doing the work, so that plans may be made, varieties selected, materials obtained, and annoying delays avoided.

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INTRODUCTION

Timeliness, which is of importance in achieving success in almost any undertaking, is particularly important in garden operations. One may postpone building a garage, or buying a new car, for a week or a month, or even six months, and when he again considers the matter find conditions the same as they were before; but the delay of a week or two in making a hot-bed, planting a hardy border, or setting out evergreens, may mean upsetting a garden plan for a whole season, the loss of a year's time in getting results, or the waste of expensive plants. Conditions of temperature and soil are constantly changing, and unless one can keep the garden work caught up, or a little ahead, the routine tasks cannot be done successfully and with a minimum of labor, nor time be gained for those extra things which make it possible to build up and improve the place.

On the other hand, the gardener who imagines that his work can be reduced to a set of rules and formulæ, followed and applied according to special days marked on the calendar, is but preparing himself for a double disappointment. Few things are so certain to be uncertain as the seasons and the weather; and these, rather than a set of dates, even for a single locality, form the signs which the real gardener follows. That is the great trouble with much book and magazine gardening.

But there is a more important argument against such follow-the-rule gardening, even were it possible to succeed with it. It would be a joyless gardening! It might be cheaper, but it would be little more attractive, than gardening at the grocers' and the florists',—where the most certain results are to be had with the least labor.

No: to be efficient, and what is even more important, to find exhilaration and recreation in his work, or hers, the

gardener must know not only what to do, and when it should be done, but *why* it should be done. In fact the first two conditions are contingent on the third.

To understand the habits and requirements of plants; the properties of the soil which contribute to their well-being; the signs and warnings and prophecies of Nature; so that one may work close and follow her leads—realizing always that she is a fickle dame who may not hesitate to trump a safe trick or play low on third hand with the most careful and experienced partner!—to develop, in a word, a sixth sense which keeps one *en rapport* with the “feel” of the soil and the season;—this is to become a member of the informal but world-wide fraternity of “gardeners.” The initiation is long, and to a degree strenuous,—and it must be self-administered.

Let the gardener, then, read this book with a diligent eye for such advice and suggestions as he can apply to his own problems, but without any attempt to follow it blindly: for the real work, like the profit there may be (ten dimes saved is a dollar earned!), and the pleasure there is sure to be, must belong to the gardener, and cannot be put between the covers of a book.

CRANMERE FARM,
April, 1917.

AROUND THE YEAR IN THE GARDEN

AROUND THE YEAR IN THE GARDEN

January: First Week

MAKE YOUR PLANS NOW FOR SPRING AND SUMMER WORK

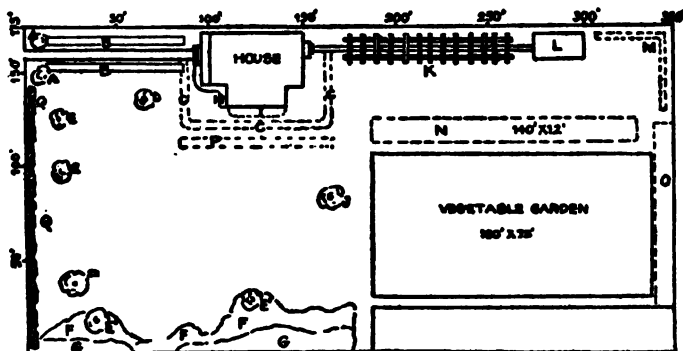
With the beginning of the New Year thoughts turn to the coming season's work in the garden. No matter how large or how small your plot, no matter whether you raise vegetables or flowers or fruit, the advantages to be gained by systematic management are manifold. The first thing to do is to get a definite idea of the amount of ground at your disposal. The second is to make up a budget; in all probability you can figure up pretty accurately how much you will want to spend during the year for seeds, fertilizers, new plants, shrubs, tools, and so forth.

A small plan of your grounds, drawn to scale, will enable you to calculate quickly the amount of space that can be devoted to any particular purpose. Such a plan will also make it possible to arrange the work of beautifying your grounds and home for several years ahead.

The actual work of making the plan is a simple matter. Half an hour's work with a tape measure will enable you to get all the dimensions you need. The plan drawn to scale from them may be as simple or as elaborate as you care to make it. A good method is to draw the permanent features, such as the boundary lines, drives, walks, buildings and large trees, *in ink*, and the things that you may possibly care to shift round, such as the vegetable garden, the flower beds, bulb borders and small shrubs, with hard pencil. **Proposed** additions and improvements, such as a hedge

along the front of the lawn, a pergola over the path leading to the garage, or a grape arbor in the rear, may be indicated by *dotted* lines. Such a plan will enable you to see at a glance whether any new idea may be advantageously worked into the general scheme of improvement, and you can calculate, without having to go out into the garden, how many plants or bulbs or how much seed it will take for any particular planting you wish to make.

No person who takes a place with the idea of living per-



Make a Plan for Future Planting. A, Large shrubs at entrance. B, Narrow beds along front walk. C, E, F, G, H, I, J, Decorative shrubs and trees. K, Pergola. L, Tool house. O, Hedge along street. C, M, N, O, P, Path, grape-arbor, strawberry bed, cane-fruits, and bulb-border for future planting.

manently upon it should drift along from year to year without any definite plan of development. The place may be anything from a suburban plot to a 200-acre farm. There are latent possibilities in both kinds of places, but no two owners will agree as to the best way of developing any particular place.

It is also essential to select the particular ideal toward which your efforts are to be directed. If your aim is to have a home as beautiful as possible, and enough vegetables to supply the family table, make yourself familiar with examples of good taste in planning the home grounds and master the details of vegetable growing; if you think you are a natural-born poultryman lay your plans for an increasing number of colony houses; if you have tackled the

problem of making a living on a real farm pick out your specialty and lay out your lines for experiment and expansion with that in view. But first fix the mental photograph of what you want to accomplish. Then you can follow a step-at-a-time policy as circumstances permit, which will not mean wasted effort. A step at a time in a straight line toward a definite goal will mean rapid progress; steps in no fixed direction may mean no progress at all.

Look Over Tools and Seeds

Even on the very small place quite a number of vegetable seeds accumulate as the result of left-overs from former gardens. The garden-line breaks, trowels and hoes are lost, glass in the hot-bed sash gets broken, tools are lent to neighbors who forget to return them, and there are a hundred and one other little things that, if attended to now, may save a great deal of annoyance and delay and possibly considerable loss later on. It is an excellent plan to put everything in order now in the tool shed and the seed boxes, to make any needed repairs, and to make at least mental notes of the various things on hand and those that will be needed by spring.

Seeds left over from the previous year's garden may or may not be good. The first rule for the gardener is: When in doubt throw them away! Never for one moment let the price of a new lot of seed weigh against the possibility of even partial failure. Some seeds, however, keep for a number of years, as follows: Beans, 3; beets, 6; broccoli, 5; cabbage, 5; carrot, 4; cauliflower, 5; celery, 8; cucumber, 10; eggplant, 3; endive, 10; gourds, 6; kohlrabi, 5; leek, 3; lettuce, 5; sweet corn, 2; muskmelon, 5; onion, 2; oyster plant, 2; parsley, 3; parsnip, 2; pea, 2; pepper, 4; pumpkin, 4; radish, 5; spinach, 5; squash, 6; tomato, 4; turnip, 5; watermelon, 6.

Usually there is no way of telling how old the seed is when you get it, so the only safe method is to test for germination any that may have been left over. Take a small box, such

as a cigar box, or a flat for a larger number, and plant fifty or a hundred seeds in each row. A more convenient way is to place the seed between pieces of moist blotting paper, or on a wad of cotton in a tumbler with a little water in the bottom. Planting in the soil, of course, corresponds more nearly to the conditions under which the seeds will be planted and gives a better idea of the percentage of germination that may be expected. Of most kinds at least eighty per cent, and in a majority of cases ninety per cent, should sprout readily. Be sure that the soil is never allowed to dry out.

In looking over your implements do not be content with merely being able to find things. They should be tuned up to work as well as new. First, get them sharp; on all tools with blades you should maintain a cutting edge. If your various tools of this character—hoes, wheel-hoe blades, weeders, sickles, scythes, and so forth—are in very bad shape, the services of grindstone or emery wheel will be required; if they simply need “touching up” whetstone and file will answer the purpose.

Paint is Cheaper Than New Implements

Second, you must fight rust at every possible point, not only because it will wear your tools out much faster than hard use but because it interferes with your work. Take off all of the nuts on the various attachments, soak them in kerosene until they can be made clean, then put on a little heavy oil or vaseline and work them until they can readily be turned on and off and any desired changes made without trouble.

After use for a season or two the larger tools, such as the wheel hoe, seed-drill and wheelbarrow, will usually show many spots where the paint has been knocked off or has peeled off, allowing a foothold for rust. Rub down the edges of the raw spots with sandpaper or a wire brush, wipe the rest of the machine off clean and dry, and give the whole a light coat of paint over such portions as

were painted when the machine was new. Paint is much cheaper than new machinery, to say nothing of the added pleasure of having clean, bright-looking tools to use.

The hand sprayer, whether of the knapsack or the compressed-air type, should also be overhauled unless it has been used occasionally since summer for other jobs. If it fails to work take out the plunger and soak the washer in oil for several hours; or if the washer is worn or cracked beyond use get a piece of heavy leather and cut out a new one, being sure to make it an exact duplicate of the old. If the nozzle or any valve or spring has become corroded soak it for a day or so in kerosene and then clean thoroughly.

By all means go over the cold-frame and hot-bed sashes and put them into shape unless they are comparatively new. Few other things will deteriorate so quickly if neglected, so that water can soak through to the wood. Kept in good condition, on the other hand, they will last for many years. In making repairs it is important to use only the best grades of paint and putty. In putting in new glass or in patching, scrape back to sound dry wood, and give a coat of paint before putting the putty on. The putty should be applied under the glass as well as over it. What is known as liquid putty may be bought for about sixty cents a quart from your seedsman; this is a semi-liquid paste that is very good for this work, as it hardens on the outside but remains plastic inside, adhering better to glass than to wood and making future repairs much easier. After repairing the sash should be given a coat of "outside white" or of special greenhouse paint, applied extra thick over all joints and mortises.

New sash should be ordered now if you are going to want any for this spring's work. Get those of the best quality, even if they cost fifty cents or a dollar more. They should be so constructed that there is the least possible exposure where the pieces are mortised together.

January: Second Week

AN EQUIPMENT OF TOOLS FOR THIS SUMMER'S SUCCESS

There is a saying that it's a poor workman who finds fault with his tools. Nowadays it's a poor gardener, if his time is worth anything, who is content with any but the best of tools. That does not necessarily mean the most expensive ones. All garden tools are cheap enough, but a poor tool, no matter what its price, is expensive in two ways—it is less efficient, and it gives out quickly, to say nothing of the fact that a poorly tempered tool makes an ill-tempered gardener.

A sufficient equipment of garden tools is a factor in garden success. The man who is growing for his own table will frequently get along year after year, skimping on a few dollars' worth of tools that he knows he needs. He argues with himself that he isn't getting any money out of his garden, so he must put no more into it than he absolutely has to. He fails to realize that in all probability he is getting two or three times as much profit out of his crops as the commercial market gardener gets. His whole output is taken, if his garden is rightly managed, by the best market so far discovered—the home kitchen. It is worth at least as much as would be paid for stale stuff at the store.

Another thing that keeps many people from buying needed small tools is that they do not calculate the actual cost. They decide that it will not pay to invest a dollar in a spading fork, or seven and a half dollars in a sprayer, or ten to fourteen dollars in a combination wheel hoe and seed drill. But if tools are well cared for they should last on an average at least ten years, which makes an annual

cost of ten per cent of the purchase price; ten per cent more will under ordinary conditions cover the charge for interest and the cost of repairs. The saving made by not getting a spading fork that costs twenty cents a year, a spraying machine that costs a dollar and a half a year, or a seed drill and wheel hoe that costs two dollars a year—a man's labor for one day—is often wholly imaginary. In the home garden it is often possible to lose several dollars by saving one.

There are now special tools for doing most of the garden work, including the preparation of the ground, planting, cultivating, forcing and protecting plants from insects and disease, supporting vines and climbing plants, and harvesting. Some of these tools are of little practical use, but the great majority are of real advantage in getting better and quicker results in the special and particular work for which they are designed.

Special Tools for Different Kinds of Work

Of the various tools useful in handling and preparing the soil, one or two makes of hand garden plows are practicable for fairly light soil where there is no rubbish or manure to be turned under. The depth to which they will work is, however, quite limited, and for gardens too small for a horse and plow the trustworthy spade must be relied upon. The spade is put to frequent and severe use, so buy the best one you can find even if it costs a little more. A cheap one will not stand up under the work; the blade is likely to wear down quickly or to become bent, which is worse yet. A spade that has once been sprung is ever after a source of annoyance and delay. A poor spade is likely to give out where the blade joins the handle. A good spade should have steel straps, front and back, running well up the handle. Some persons prefer the spading fork to the regular spade. In many soils this will do just as good work, and do it more rapidly; it is lighter, goes into the ground more easily, and is better adapted to breaking up lumps of

earth and to gathering up rubbish or manure that may be in the way.

Any garden that is large enough for the use of a horse can be plowed better and more quickly than it can be dug. A one-horse swivel plow that is especially good for use on the small place or in the large garden costs about ten dollars. Its advantages over the ordinary one-horse plow are that it leaves no dead furrows and tramped corners; hillsides can be plowed; closer work can be done and any furrow can be turned either way. When you buy a plow by all means get a colter with it; with it litter, manure or a cover crop can be turned completely under so the harrow or rake will not drag it up.

The iron rake ranks with the spade as an implement of prime necessity; every gardener must use it frequently, but few do use it so constantly as they could to advantage, especially after crops are planted. The bow type of rake costs only a few cents more than the other kind and is less likely to bend or break. A small attachment like a hoe blade, arranged so it may be fastened to the back of the rake, is very useful in cutting out weed stumps or clumps of sod or grass that would probably break the end of the rake.

Some Hoes You Should Have

To the uninitiated a hoe is a hoe. But there are now numerous types, to say nothing about makes, on the market. At least three different kinds will be needed in the average-sized garden. The first is a sort of hybrid between a rake and a hoe—the flat-tined hoe. This is useful in leveling off and making fine ground that is too rough for the iron rake; in clearing and raking off litter or rubbish; in working the soil between rows too narrow for the use of a plain hoe; in working over manure; in gathering up stones; in digging potatoes, and in other ways.

The second kind is the ordinary garden hoe—but you should pick out one with a thin, sharp blade, a solid shank, not a ferule, and a “hang” that is just right, so that it makes

you want to get out into the garden and use it as soon as you get your hands on it. There is always more or less heavy work to be done during the season which makes such a hoe necessary. But for three jobs out of four in the garden, except in a very heavy soil, the small, light onion hoe is to be preferred. When you use one of these for the first time it seems like playing at gardening instead of working—but you will notice that the work gets done with a great deal less elbow grease.

Then there is the warren or heart-shaped hoe, which is especially good for opening and covering furrows, digging holes for plants, and so forth. The scuffle hoe or push hoe is different from all the preceding. When a wheel hoe is used there is little use for the scuffle until late in the season, when the crops are so large that the wheel hoe cannot be used to advantage. While not absolutely essential, the scuffle hoe is extremely useful in preserving a dust mulch and in keeping small weeds from getting a too vigorous start late in the season. The price is moderate, sixty cents to a dollar. In buying pick out one that is narrow enough to go through your narrowest rows.

Even the smallest of gardens should have a wheel hoe in its tool outfit. The simplest type with several different attachments costs only a few dollars. As it is a machine that you will probably use in the garden more than all your other tools put together, be sure to get one capable of doing all the work you may have to give it. The double-wheel hoe has a distinct advantage over the single-wheel in that the rows can be straddled, permitting very close work while the plants are small and accordingly cutting down the laborious task of hand weeding. If your garden is at all large the amount of time you will save in weeding it the first time with a double-wheel hoe instead of with a single-wheel hoe will make you satisfied with the slight additional investment. In addition to the attachments that come with the double-wheel outfit, you should get either the disk attachment or a pair of hoes with extra high sides, which will keep any earth from being thrown over the smallest plants.

By all means get a wheel hoe with a seed-drill combination. Life is too short, garden space is too valuable, the work of thinning plants and cultivating uneven rows is too costly, to justify anyone's planting a garden by hand. When you can mark the row, open the furrow, drop the seed, cover it, roll it, and get it straight, in one operation, as fast as you can walk, the laborious task of hand-sowing seeds like onions, carrots, beets or turnips is out of the question. In addition to doing the job better and infinitely faster, covering all the seeds with fresh earth and dropping them at a uniform depth, the seed drill leaves the row neatly rolled on top, so that you can see where to cultivate before the plants are up.

No tool has yet been invented that does away with the worst gardening job of all—hand weeding. For the careless or inexperienced gardener this task is likely to seem unending and nearly hopeless. Having tools with which you can work close to the row, and using them before the weeds start, will enable you to get through it with the fewest possible hours of backache and sore knees. Hand weeding used to mean sore fingers, too, but now there are a number of hand weeders of different types that lessen the disagreeable features of the task.

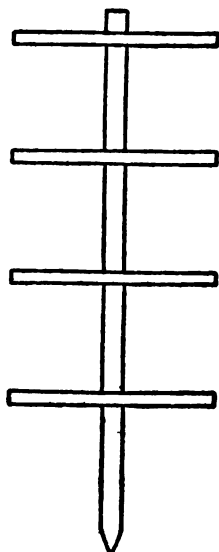
No gardener can be sure of harvesting his crop, no matter how rich his soil nor how good his seed, unless he is prepared to fight effectually the various insects and blights. Some sort of spraying machine is a real necessity. For the very small garden a good bucket pump will answer the purpose. But pumping from a bucket is not a convenient, effective or safe way of applying poisons or insecticides. On every small place a sprayer, either of the knapsack or of the compressed-air type, will be needed sooner or later, and a great deal of annoyance and loss may be averted by getting it sooner. A first-class machine will cost from five to ten dollars. Whatever type of sprayer you get, be sure to get a brass one; many of the compounds that will be used in it will quickly eat through even galvanized iron.

Protectors for Early Plants

There are a number of good machines for applying powder or dust preparations in a dry state. These are less expensive, but when there is a limited amount of work of this kind it is much better to get a good spraying machine, as practically every remedy that is made in powder form can be duplicated in a spray.



A number of plant protectors of various types are used to keep off frost and insects during the early stages of growth. All these are useful, but many of them are somewhat prohibitive in cost. With a little ingenuity and a few tools substitutes for some of them may readily be constructed at home. Garden frames, for instance, may be made of cracker or soap boxes. Deep boxes should be cut in two parts; shallow ones may be used as they are. Simply remove top and bottom, and cover the top with protecting cloth; or drive in "finishing" nails, which will not split the wood, and bend them over so they will hold in place on the top side a pane of glass cut slightly smaller than the outside dimensions of the box. These frames will prove extremely useful in forwarding hills of early cucumbers and melons, lima beans, and a few extra early tomatoes, peppers or eggplants.



Supports for tomatoes and pole beans may be constructed quickly from 2-by-2-inch or 1½-by-3-inch scantling and laths, the former being cut into posts five to eight feet

long, as may be required, and the latter nailed across at intervals of twelve or eighteen inches. These not only give a much better bearing surface for the vines than do poles, but they will last much longer and will always look better.

One thing that offers an opportunity for money saving is frequently overlooked—the tool chest. For some persons tools are an excellent investment; for others they are absolute waste of money. Without good care tools soon become practically useless. Any handy person can, with a very few tools, not only do the ordinary repair jobs about the place, but find numerous construction jobs that will save time and steps, and add to the appearance of things. In buying tools aim at quality rather than variety. An elaborate outfit is not necessary. By buying one good tool at a time, and then taking good care of it, one can soon acquire a good outfit without greatly feeling the expense.

January: Third Week

UP-TO-DATE TOOLS—SUGGESTIONS ABOUT THEIR SELECTION, USE, AND CARE

The returns from garden operations are not determined by the *size* of the garden, but rather by the amount of *work* done in it. Even a very small garden, managed so as to produce the maximum of which it is capable, will show astonishing results. High-pressure gardening of this kind, however, necessitates more time—and time is just the thing on which the average home gardener is short. Usually he is limited to a definite period each day, and as there is no known method of stretching time, the only solution to the problem is to use tools which will increase the amount of work which can be done in a given time. The money you spend for a good tool is really only the buying of extra time for work in your garden.

Even in a small garden a combination seed drill and wheel hoe will pay for itself handsomely. A combined seed drill and single-wheel hoe, with plow, hoes, cultivator teeth, rakes, guards, and marker, can be bought for ten or eleven dollars. That may seem at first glance like a lot to spend on a single tool for a small garden; but such a machine will last ten years or longer; the first seed drill I ever owned had been in use ten years when I got it, and after using it three years myself I sold it for three dollars, and the last I knew it was still doing good work. Although this is "one implement" here are the things it will do: open a furrow; drop seed of any kind, at any depth desired, in a continuous row or in hills; cover the seed with *fresh* soil; roll the soil, leaving a neat, narrow, plainly marked row; and mark out the next row—all in going once over the ground and as fast as you would usually walk. Think of the amount of *time*

wasted in doing this same work by half a dozen laborious hand operations, and then not nearly as well! By changing the tool to a wheel hoe, it will hoe the ground between the rows, working close up to them and killing all small weeds; or cultivate it, breaking up the crust if one has formed, and leaving the soil loose and fine; or rake it, creating a dust-mulch on the surface to conserve soil moisture; or plow shallow furrows, in which to put fertilizer or manure, or large seeds; and hill such things as are benefited by having the soil thrown up toward them during their growth. All of these things done more quickly, and in most cases better, than they could be done by hand.

The double-wheel hoes cost two or three dollars more than the single-wheel type, and have several advantages, particularly in working crops during the earlier stages of growth; and personally I would always spend the small amount additional required to get this type. The double-wheel machine can be used as a single wheel when desired. I never yet met a gardener, large or small, who regretted the money he had spent on a good double-wheel hoe.

In selecting implements of this kind, there are a number of things to be borne in mind. I have used at various times five different types of seed drills, and some eight or ten of wheel hoes, and I have never yet found any one of either which was best in every respect. The kind of work to be done and the condition of the soil, make a difference; and the personal factor must also be taken into consideration, as I have often found that two men working side by side will prefer different types of tools for doing the same work. Of the things to think of in buying any tool, however, first in importance is the material and the way in which the parts are finished up. A machine that is poorly made and roughly finished will not only wear out sooner, but will not do equally satisfactory work while it does last. Another requirement is that the changes may be made quickly and easily. One of the great advantages of an implement of this kind is its great adaptability, and a machine that will rust or get stuck, and be such a nuisance to change that you are

apt to leave it in one form from the beginning to the end of the season, will be a poor investment. There will be work for each different attachment, and it is highly important that all changes can be made with ease and dispatch.

The machine should be easy to work. The type you will find preferable will depend to a large extent upon the character of your soil. Some people prefer the high-wheel type, and others the low. In light, soft soil, where the wheels are likely to sink in, the higher wheels work easier. On the other hand, in rough or stony soil, it is more difficult to work very close to small plants without cutting into the row. Having both types of machines on hand, I use either one or the other according to the work to be done; but if I had to select a single machine, which is ample for a small garden, my choice would largely depend on the character of the soil. A third type has a frame that fits against the body to make one's weight available in pushing it, but except for plowing, or use in very heavy clay soil, this is of negative advantage, as it adds to the weight and interferes with the backward and forward stroke of the machine which is used in most kinds of work.

Efficient Use of the Wheel hoe

While in the use of the wheel hoe, as in other arts, practice only can make perfect, there are a few suggestions which can be given which will help the beginner to become proficient. First of all, find a place to keep the machine and all its attachments where it is perfectly dry, and safe from promiscuous borrowers. Keep the axles and working parts of the seed drill well supplied with oil, and occasionally put a few drops of kerosene on the bolt and nut threads to keep them bright and working easily. Take pains to select the attachments best suited to the particular job you are going to do. Take time, after you have the right attachment, to get it *adjusted* just right: this is of the greatest importance and many people are not careful in this respect.

Unless the ground is so wet that it should not be worked,

or you have allowed the weeds to grow so big that they clog things up, you may be pretty sure that it is your fault, and not the machine's, if it does not do satisfactory work. In learning to use the machine, train yourself as soon as possible to keep your eye on the *wheels* rather than on the hoes or cultivator teeth that follow them. At first you will find yourself inclined to do just the opposite, with the result that while you are watching the blades, the wheels will veer off to the right or the left, and you will cut into the row. If you hold the wheels steady, the rest of the machine has got to follow. Do not push the machine along steadily, but work it in long, steady strokes, drawing it back a few inches each time.

A number of the attachments mentioned in the following paragraphs are to be had as "extras," or in some cases, in place of the regular equipment. For anyone who already has a wheel hoe, their cost is so little that they may be readily afforded. Perhaps the most important of all of these are the hoes with extra high "standards" or guards. I emphatically recommend the purchase of a pair of these in addition to the regular equipment.

PLOWING. Generally, except in cases where the ground is already in good condition from previous planting, more satisfactory work can be done with the spade or spading fork, than with any hand plow I have ever tried or seen. The same is true of hand raking of the seed bed, to level and prepare it for the drill. The hand wheel plow, however, is often useful in loosening up ground that has already been plowed or spaded, and has lain for some time before you are ready to plant it, or in plowing small furrows for putting in manure, or in which to plant peas or beans or corn with the drill.

SEED-SOWING. Have the ground made as smooth and fine as it is possible to make it with an iron rake, and *always freshly prepared*. If anything happens to prevent your planting as soon as the ground is ready, go over it again just before you do plant. Set the drill as carefully as you can for the seed you are going to plant, and then test it on a

board or a smooth floor to see how it will work. It will drop the seed usually a little thicker on such a surface than in the garden. *Watch the seed carefully*, at least at the end of each row, to see that it is running out all right. A small lump of dirt in the bottom of the seed spout or a bit of trash caught on the opening plow, may catch the seed and carry it along for some distance and then drop it in a bunch, even when it is falling from the hopper all right. Keep the rear roller wheel clean. If the soil is a little moist, and tends to stick to it, an occasional tap with the wrench—which should always be carried along in one's pocket—will dislodge it. Mark the first row out just as straight as you can get it with your garden line or a piece of string, and don't be too lazy to make a new straight line as often as the rows may begin to get a little crooked. This is important not only for looks: every crooked row means additional work every time you work it throughout the whole summer.

CULTIVATION. Cultivation should be begun *before* the plants get above ground. Where the planting has been done with a wheel hoe this is possible because the rows are distinctly marked. There are two ways of getting the best of any weeds that may start ahead of the seeds you have planted. First is to go over the whole surface of the garden, *very lightly*, with the weeder attachment, or the rakes. The best time for this is just after the seed has sprouted in the ground, and before the sprouts have got up too near the surface. Millions of little weeds will have germinated and be above the soil, but so small you can hardly see them until they begin to collect, like tiny pink and white threads, on the tips of the weeder fingers; then you will realize how many hours of work later in the season you are saving yourself. The other way is to use the disk attachment with a double-wheel hoe. With the disks carefully adjusted, and with the outside ones of each gang of three removed if the rows are closer than fourteen inches apart, you can shave right up to the row without throwing any dirt over it, nicely "discing" the ground between the rows, destroying the young weeds and breaking up the

crust. When using the disks, push the machine along steadily, without any thrusting movement. The slight ridges left will be leveled down by the next cultivation, working the soil over thoroughly. The first cultivation after the plants are up—and it should be given *just* as soon as they are up enough to mark the rows—should be given with the hoes with extra high standards or guards already mentioned. They permit very close and rapid work without throwing any soil on the plants, which is impossible with the regular hoes.

Get at the First Weeding Early

Immediately following this cultivation the first *hand* weeding should be done, even if there seem to be very few weeds visible; between the plants, as between the rows, they should be destroyed as soon as they *sprout*, and not allowed to grow until they are so big as to threaten the existence of the crop. After weeding the soil between the rows will be more or less packed down hard, and the next cultivation should be given with the cultivator teeth on the machine, to loosen the soil up again. There are three types of cultivator teeth which may be had: the regulation narrow ones; the “gang” of three or more together, of which the best have the ones nearest the row work shallower and narrower than the ones in the centre; and the separate teeth with extra wide bottoms which have the advantage, where the weeds have begun to get a little ahead, of cutting them off as well as breaking up the soil.

Every ten days or two weeks after this cultivation the garden should be run over between rows with the ordinary hoes attached to destroy any weeds which may be sprouting and maintain the dust-mulch. If the ground seems packed at all at any time substitute the cultivator teeth for the hoes. The soil should always be worked over as soon as it is dry enough after a rain. With crops such as beans, which are sometimes benefited by a slight hilling, the hoes or the disk attachments, set so that they throw the soil

toward the row instead of away from it, may be used for very rapid and uniform work. As a general thing, however, level cultivation is to be preferred to hilling as the loss of water from evaporation is not so great. Toward the end of the season, when crops which have been planted close have begun to fill up the rows, the vine lifters should be put on, and the single wheel used, with the hoes set close together, or the "sweep" or scuffle hoe attachment used in their place.

For ordinary work, going once in a row at each cultivation will be sufficient. If the weeds have begun to get a little ahead, and the first time over does not get them all, or where the rows are too wide for the hoes or cultivator teeth to work up close to the row on either side, go twice, or three times if necessary, until the work is thoroughly done. Weeds that are only partly destroyed will continue to make a rapid growth, particularly in moist weather, and if they once re-root after the main tap-root has been broken, you will have your hands full, as they form a mass of fine fibrous roots to which the earth clings, so that each cultivation simply moves them around a little without succeeding in putting them out of business.

In addition to these two most important tools, which if properly used, will do most of the work of planting and cultivating, there are a number of smaller ones which are, nevertheless, essential. The outfit of tools in your garden tool shed should include the following: a spade; a shovel; a spading fork; a flat-tined hook; a lawn rake; an iron-toothed garden rake; a standard light hoe; a small weeding or "onion" hoe; a Warren or heart-shaped hoe, for planting and furrowing; a reel and line; a scuffle hoe; a trowel and a dibber. For facilitating the work of hand weeding, there are several types of small tools designed to save one's fingers; of these select one or two which suit your individual taste; personally for most work I prefer the style with a plain bent sharp blade; known as "Lang's weeder," which most seedsmen carry; for work in hard soil, about individual plants, and in flower beds, some type of finger-weeder, with or without a long handle, will be useful.

There are many types of most of these tools familiar to all gardeners. The points in regard to them to be emphasized here are three: first, see to it *now* that your equipment for the coming season is complete, repairs or additions should be made now, while you are buying your seeds, not put off until planting time; second, whenever you buy a new tool, even if it is but a trowel, get the best quality that is to be found; third, make adequate provision for taking care of all your tools,—each one should be stamped or marked with your initial, and for each you should have a definite place in your tool house. A simple method is to have each tool numbered, with corresponding numbers painted on the wall or the shelf where they are kept, or a rough outline of the tool itself may be painted there.

In addition to these garden tools, there should be of course a lawnmower; pruning shears; a pruning saw (*not* a double-edged one); an “edger” for walks and drives; a compressed-air sprayer, and a good powder-gun for dry insecticides; and last, though not least, a light strong wheelbarrow, preferably with good *springs* supporting the wheel.

January: Fourth Week

VEGETABLE SEEDS TO ORDER FOR THE SUMMER SEASON

The most absorbing garden job of the year—if it is true that anticipation is more intense than realization—is one that will not take you out of your easy-chair. But more than likely it will upset your ease of mind. Probably by the time you had finished last season's work you thought you knew exactly what you were going to want in this year's garden. So you take up your pencil and paper and catalogues with a serene feeling that you know just what you are going to order in the way of vegetables, flowers, roses, bulbs and small fruits. But by the time you have looked through the second new catalogue, have read the testimonials about the sterling qualities of some of the things you had decided to discard and have been unable to find any mention of the fine new things recommended by your friends, you will be as much at sea as ever.

As a matter of fact this whole problem of varieties is given an amount of time and worry entirely out of proportion to its real importance. A wonderful new bean or cucumber that you admired in a friend's garden was probably the same thing, under a different name, that you had in your own, only your friend had been able to give it conditions that were better adapted. The hours spent in puzzling over varieties could be employed to greater advantage in studying the problems of making the garden soil more productive; and the money spent for wonderful new varieties could better be used in buying up-to-date tools.

Our catalogues are littered with scores of fictitious varieties and strains. It is high time that our seedsmen inaugurated a movement to standardize varieties. Guard

against exaggerated and one-sided descriptions; the general tone of a catalogue is a fairly safe guide as to the quality of the seeds and plants that are listed in it.

There are three really important points in connection with seed and plant buying—vitality, purity and breeding. The vitality of a lot of seeds may be judged to some extent by their appearance; at any rate they may be easily tested. But purity and good breeding are more difficult matters. Many states have laws that now take care of the vitality of farm seeds, but practically the only guide of the customer in regard to good breeding is his confidence in his seedsman. Even one's own experience with a particular variety or strain is not always a satisfactory test, for conditions and seasons vary greatly. It is not enough that seeds should grow and be true to name; they should be true to the best type of that particular variety.

Roguing and Selection

Crops grown for seed should undergo the processes of roguing and selection. In roguing, the seed grower goes over the crop before it is mature and removes any plants that may be off type or of another variety. In selecting seeds he takes only the best specimens that can be found, with such special points of superiority as earliness, size, uniform shape, and so forth, well fixed. When you really get hold of a strain of seeds that gives you satisfaction it is a good plan to order enough to last for several plantings.

There are, of course, some sterling novelties introduced from year to year, but as a general thing it is best to rely mainly upon strains with which you are familiar, trying out the newer ones under the same conditions before you decide they are better.

For the benefit of those whose garden experience has not yet been sufficient to enable them to pick out satisfactory varieties of the various vegetables the following may be mentioned. Some are old standard sorts, and some are

newer introductions that have proved themselves so generally satisfactory that most seed firms now carry them:

ASPARAGUS. Palmetto and Giant Argenteuil are both good. The first sort, however, came out considerably ahead in the most thorough test of asparagus varieties so far conducted.

BEANS. Before selecting the varieties of beans for your garden, be sure to have the several distinct types fixed clearly in mind. Of the earliest or string beans you will need only enough for one or two pickings—just enough to last until the wax beans, which are superior in quality, can be had. Stringless Green Pod and Bountiful are good varieties. Of the wax sorts Brittle Wax, Rust-Proof Golden Wax and New Kidney Wax are excellent. Of the pole beans Old Homestead (green) and Golden Cluster or Sunshine Wax (yellow) are good both as snap beans and when dry. Worcester Horticultural is a favorite pole variety in northern sections where the seasons are rather short for limas. Of the dwarf limas the Burpee-Improved is the most satisfactory all-round sort; the Improved Henderson is hardier and earlier but smaller, being in an entirely different class. Of the tall limas, Early Leviathan and Giant-Podded are among the best.

BEETS. Early Model is a fine extra-early sort for first planting. Crimson Globe and Columbia are good for use during the summer, being ready very soon after the earliest sorts, and retaining their quality even when they have attained large size. For a winter supply it is best to make a later planting of one of the earlier sorts, such as Detroit Dark Red, which does not get too large.

BRUSSELS SPROUTS. This vegetable is one of the several relatives of the cabbage family, and one of the finest of all vegetables for the late fall garden. Sprouts will sometimes remain on the stalks outdoors without protection until after Christmas. Dalkeith and Danish Giant are both good, the latter being a little larger.

BROCCOLI. The only excuse for the existence of this poor cousin of the cauliflower is the fact that it is hardier than

that delicious vegetable. A small early planting is worth while. White Cape is a good variety.

Cabbages the Year Round

CABBAGE. There is no reason why a supply of this vegetable should not be kept pretty nearly the year round, even with a comparatively small garden. As usually grown there is a big surplus at one or two periods in summer, and none the rest of the time. A dozen or two plants each of Jersey Wakefield, Copenhagen Market, Glory of Enkhuisen and Succession set out early in the spring, will furnish a supply of cabbage until September. Half a package each of Volga and Danish Ball Head, sown in the spring and transplanted some six weeks later, will give a supply during the fall and early winter; the other half of each packet, sown the last of May or the first of June and transplanted in July, will give a further supply during the late fall and winter. All of these varieties are good, but if you like real quality in cabbage use Savoy in place of Succession in the early and in place of Volga in the late planting.

CARROTS. For use in the frames or for extra-early use outdoors, Early Nantes is one of the forcing varieties that will give quickest results. Ordinarily, however, Chantenay or Coreless or a very good strain of Danvers Half-Long will answer all the purposes of the home garden. If your soil is very shallow use Chantenay alone.

CAULIFLOWER. To have a succession throughout the summer plant as suggested for cabbage. Remember, however, that the plants are not so hardy and cannot be set out so early. Snowball or Best Early, or any of the varieties of precisely the same type, or Dry-Weather, which is later and more robust in growth, will answer every purpose. Do not be deceived by the claims that are sometimes made for the Dry-Weather. It is a strong-growing sort, but no cauliflower can be grown successfully without plenty of moisture. With proper cultivation it can be grown in dry weather, but not in a dry soil.

CELERY. Golden Self-Blanching and White Plume for early planting, and Winter Queen or Boston Market for late, make up a combination that will supply celery from early fall until late spring. For earliest use start some seed in early February; for the winter crops sow the seed outdoors about the first of April.

CORN. There are a large number of varieties of sweet corn but there is probably none quite so universally esteemed as Golden Bantam; it is one of the earliest and sweetest, with a flavor all its own. It is particularly good for the small garden, not only for the first but also for the succeeding plantings on account of its dwarf habit of growth which permits much closer planting than the older types. Metropolitan and Howling Mob are fine second early sorts; White Evergreen is still the standard late; Black Mexican and Country Gentleman have exceptionally good flavor.

CUCUMBERS. Of the many strains, selections and improvements of the old White Spine, Davis Perfect is on the whole the most satisfactory. It matures very little later than the extra-early sorts and keeps its quality as well as its color for a remarkable length of time. For some extra-quality fruit try one of the English forcing varieties in a frame. Telegraph is one of the best.

EGGPLANT. Black Beauty is the most satisfactory all-round sort so far developed.

ENDIVE. Giant Fringed and Broad-Leaved Batavian are both good, but quite distinct in flavor. The latter, known as Escarolle, is preferred by many.

KOHL-RABI. This vegetable, which is a sort of over-ground turnip, with cabbage flavoring, is very easy to grow, and if gathered for the table while it is still quite small—two or three inches in diameter—it is very good. There are few varieties, and these differ chiefly in color.

Lettuce for Spring, Summer, and Fall

LETTUCE. To have a continuous supply of this best of salads be careful to select types suited to the seasons in

which they are to be grown. Mignonette, Grand Rapids and Big Boston are three of the best sorts for use in the frames in spring and fall, and for the first planting in spring. Mignonette is very small, with reddish-brown outside leaves, but it makes a very solid head deliciously tender and sweet. Grand Rapids is the best of the loose-heading sorts, having very tender, closely crumpled leaves which form a very solid loose head. Big Boston is one of the very best of the large-heading butter-head varieties, suited for growing in cool weather. For a supply during the hot summer months, Salamander, All Seasons, Brittle Ice and New York (Wonderful) are all good. The latter two, of the cabbage-head type, are quite distinct, having thick leaves with heavy incurving midribs, and form unusually solid heads. The Cos type of lettuce is also excellent, especially for summer use, but it demands very good growing conditions and more care.

A Muskmelon That Runs Three Feet

MUSKMELONS. There are a large number of good varieties but Netted Gem or Rocky Ford is the most popular green-fleshed sort, and Emerald Gem is wholly satisfactory for salmon-colored flesh. For cool climates Montreal Nutmeg, a large, green-fleshed sort, is unexcelled for quality. Spicy is a large, oval, orange-fleshed variety, quite distinct from most others, of very healthy growth and excellent flavor. Henderson's Bush is a new and distinct type of particular advantage for the small garden. It can be planted much closer than the ordinary sorts, requiring only about half as much space for each hill. The fruits are rather small.

ONIONS. The white sorts are the earliest to mature and the mildest in flavor, but they are harder to cure and not such good keepers as the yellow and red varieties. Silver King and Southport White Globe are good white sorts, the former considerably earlier. Southport Yellow Globe and Prizetaker, the latter larger but not so solid or long keeping, are two of the best yellows; while Southport Red Globe and Red Wethersfield, the latter earlier, are the standard reds.

Gigantic Gibraltar, an Americanized Spanish onion, is exceptionally large and mild, but is not certain to mature properly unless started in a frame and transplanted. Ailsa Craig is another very large sort, suitable for handling in the same way.

PARSLEY. The several varieties are quite similar, varying somewhat in color and degree of "crinkling." Emerald, or Double Moss Curled, is very good.

PARSNIP. Several new varieties have been introduced, but Improved Hollow Crown is hard to beat. For shallow soil Offenham Market has the advantage of being chunkier in growth.

PEAS. Before ordering be sure you are going to be able to get round to supplying brush or a trellis by the time the peas are ready for it. Gradus or Prosperity and Thomas Laxton for early, and Alderman, Boston Unrivalled or Royal Salute for main crop, will give excellent satisfaction. Succession plantings of one of each of these early and late sorts, made about three weeks apart until hot, dry weather and again in August, will keep the table well supplied. If you want dwarf sorts use Laxtonian or Blue Bantam for early, and British Wonder and Dwarf Champion or Juno to succeed them. These are all wrinkled or sugar sorts. Of the hard round-seeded sorts, which can be planted earlier, but are ready for table only a few days sooner than Gradus or Laxtonian, the most satisfactory sort is Pilot; the pods are large and the quality is almost as good as the sugar varieties.

PEPPERS. Neopolitan Early and Ruby King make a good combination for the home garden. Chinese Giant is larger and sweeter than Ruby King, but requires a longer season to mature.

RADISHES. There are dozens of good varieties, but the only way to have any of them fit to eat is to make frequent succession sowings. Crimson Giant and White Icicle are favorites for spring and fall. White Strasburg and Chartiers are standard summer sorts. Celestial is an enormous but a mild white winter sort.

SPINACH. Victoria for spring and Hardy Winter for fall

sowing are good sorts. Swiss Chard, while really a beet, is used as a most satisfactory substitute for spinach. Lucullus is the best variety. From a single early spring planting greens may be cut until hard freezing weather; with protection the plants are hardy except in very severe climates. The midribs of large leaves, stewed, are very delicious.

SQUASHES. The old reliable Warted Hubbard, Delicious and Heart o' Gold are three varieties of good table and keeping qualities. For the small garden, however, Delicata or Fordhook and Bush Fordhook, which are good for both summer and winter use, are the most desirable. The scalloped and crookneck summer sorts are earlier, but a very few hills, two or three of each, should suffice.

TOMATOES. Bonny Best and Chalk's Early Jewel will be found especially satisfactory for the home garden, as they are not only early and of good quality and color, but bear throughout the season fruits that in everything but size are as good as any of the late sorts. Matchless and Ponderosa are splendid late sorts; the latter is larger, but is more subject to cracked and deformed fruits. Dwarf Giant and Dwarf Stone may be grown without supports, and bear first-quality fruits.

TURNIPS. The summer sorts go by very quickly and only small plantings should be made until early in July, when the crop for winter may be put in. Early White Milan and Petrowski for early, and Amber Globe and White Egg for late, are good sorts. Both of the former are smooth and mild, and the latter are good keepers.

WATERMELONS. Fordhook Early, Halbert Honey and Sweetheart are all early enough to ripen in an ordinary season in the cooler sections. Halbert Honey is the sweetest flavored, and makes a good selection. For earliest results start a few hills in paper pots in a frame, and transplant outside as soon as the weather is warm enough.

February: First Week

MAKE A PLAN NOW—AND FOLLOW IT THIS SUMMER

No single factor in garden management makes for greater saving of time and work than a carefully-thought-out, definite-to-the-foot garden plan. Such a one should be prepared long before outdoor operations begin. Perhaps it will take several hours' thoughtful and careful work to make it, especially if you have never made one before, but every hour spent now will save several hours in the garden later on. The plan should show your actual garden, drawn to scale, as you mean to make it; it should show just how much space you intend to use for each crop, where you intend to sow second crops, and, if you want to do really intensive gardening, where you will grow companion crops. It will help you not only with this year's gardening but with next year's as well; without it you will be only guessing at your crop rotations.

First get the exact dimensions of the plot or plots of ground that you expect to devote to gardening; then draw an outline to scale. One-eighth of an inch to a foot for a medium-sized garden, or one-quarter of an inch to a foot for a small garden, will be found a convenient scale. When it is possible to choose the garden site a rectangular plot that can be plowed and harrowed the long way and planted the short way will be found best. If the garden is large and square it will generally be a good plan to divide it by a permanent path; rows fifty feet long are ample for the average garden. The aim should always be to keep the rows short enough, in proportion to the size of the garden, so the row will be a planting unit. Always figure your plantings in rows—not in seed quantities.

Next, on another piece of paper, write a list of the various vegetables that you plan to have, and decide how much space to give to each one. In the case of vegetables for succession planting put down the number of rows for each

DATA FOR THE GARDEN PLAN

VEGETABLE	NUMBER OF SOWINGS	DISTANCE BETWEEN ROWS	DAYS TO MATURITY	MAKE LAST PLANTING
Beans, dwarf....	2-6	15-24 inches	45-75	Early August
Beans, pole.....	1	3-4 feet	60-100	Mid-June
Beets.....	2-4	12-15 inches	60-80	Late June
Brussels sprouts..	1-2	2-3 feet	65-90	July
Cabbage.....	2-3	2-3 feet	60-90	July
Carrots.....	2-3	12-15 inches	60-90	Early June
Cauliflower.....	2-3	2-3 feet	50-80	July
Celery.....	1-2	2-4 feet	125-150	July
Corn.....	2-4	3-4 feet	60-80	Early July
Cucumbers.....	1	4-6 feet	60-75	June
Eggplants.....	1	2 feet	50-75	June
Kohl-rabi.....	2-4	12-18 inches	60-80	Late July
Lettuce.....	2-6	12-18 inches	40-75	Early August
Leeks.....	1	12-15 inches	120-140	May
Melons.....	1	4-7 feet	90-120	June
Onions.....	1	12-15 inches	120-175	Early May
Parsnips.....	1	15-18 inches	150-175	April
Peas.....	2-4	1½-4 feet	60-80	Early August
Peppers.....	1	2 feet	40-60	June
Potatoes.....	1-2	2-3 feet	60-100	Late June
Radishes.....	Every 10 days	12 inches	25-50	Late August
Spinach.....	1-3	12-18 inches	60-75	May
Swiss chard.....	1	15-18 inches	50-60	May
Squashes.....	1-2	4-8 feet	60-100	June
Tomatoes.....	1	3-4 feet	40-60	Early July
Turnips.....	2-4	12-18 inches	60-90	July

planting, thus: Bush beans: 6 rows, first planting; + 2, second planting; + 4, third planting = 12 rows. Cabbage: 1 row, early, + 2 rows, midseason + 4 rows, late for winter = 7 rows. Multiply the number of rows of each thing by the number of feet apart they are to be put, to get the total space to be devoted to each. For instance: Onions: 6 rows, 1 foot apart = 6 feet. Beans: 12 rows, 18 inches apart = 18 feet. Tomatoes: 2 rows, 3½ feet apart = 7 feet. The correct number of feet apart at which the various things are usually planted may be found in the accompanying table.

Fit the Crops to the Garden

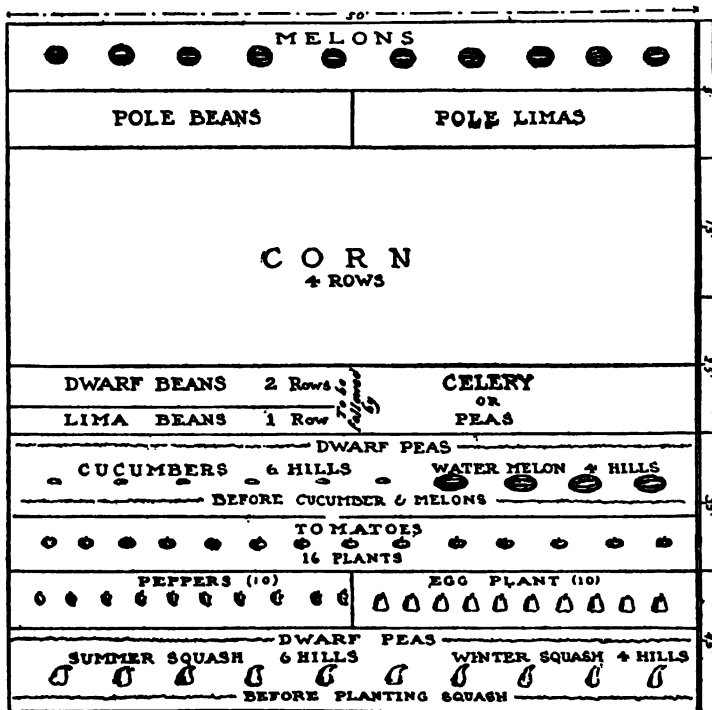
Your list of vegetables and spaces should now be separated into two parts—one of original crops, the other of those things that may be planted where something else has been grown before. Find the total space required for your first planting, and if this exceeds the size of your plot cut

Early	CABBAGE	5	Row						
	CAULIFLOWER	1	"						
	CABBAGE	1	"						
	CAULIFLOWER	1	"						
	BEETS (P)	1	"						
	LETTUCE (P)	1	"						
	RADISH	1	"						
	LETTUCE	1	"						
	BEETS	2	"						
	CARROTS	2	"						
	KOHLEBI	1	"						
	TURNIP	1	"						
	SPINACH	1	"						
	ONION SETS	.	.						
	ONION	.	.						
	PARSNIP	.	.						
	SALSIFY	.	.						
	SWISS CHARD	.	.						
	Dwarf PEAS	4	"						
	Early CORN	3	"						
	Early POTATOES	2	"						
	CELERY	2	Rows						
	LETTUCE	1	Row						
	CARROTS	1	"						
	BEETS	2	"						
	CAULIFLOWER	1	"						
	CABBAGE	1	"						
	LEEK	1	"						
	BRUSSELS SPROUTS	1	"						
	TURNIPS	3	"						
	LETTUCE	1	"						
	Tall PEAS	3	"						
	July 1 st CORN								

down the items. If you find you cannot spare nine feet for your first planting of beans without sacrificing something that you would rather have, put in fewer rows.

So far the process has been merely mechanical, but next comes the test of your skill as a gardener. Your problem is to fit your crops into your garden, observing as far as possi-

ble the following rules: First, to keep together in one place all the long-season crops, and together in another place the quick-growing crops that can be followed by others. Second, to keep together crops that are similar in cultural requirements, such as carrots, beets and turnips, or toma-



atoes and pole beans. Third, to keep together crops that will mature at the same time. Fourth, to keep crops from occupying the same ground that crops of the same family or of similar habits of growth occupied the previous year. In small gardens, where there are only a few rows of each thing, this is not so important. Fifth, to give the various vegetables favorable conditions as far as is possible. If the soil at

one end of the garden is rather light put the beans there; if the soil at the other end is lower and heavier put the celery there. If part of the garden is to be newly broken use that for corn or potatoes, and keep such things as onions and carrots, which require a particularly fine seed bed, on the old ground.

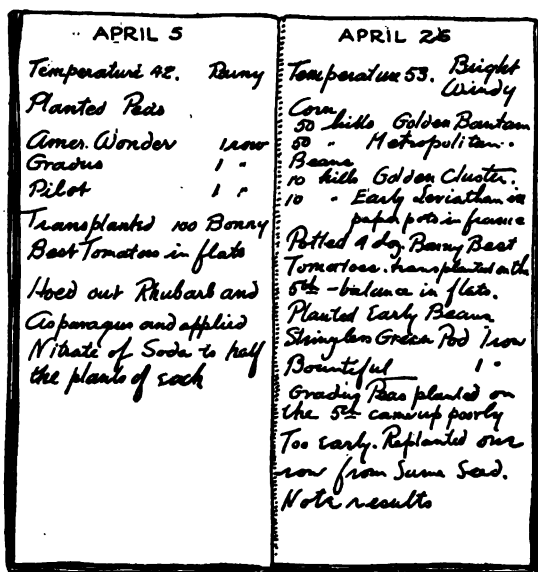
When your plan of first plantings is completed, take the late and succession crops and arrange them in the same way. Careful attention must be paid to the time when the first crops will be removed. The usual time required for crops to mature is shown in the accompanying table. There is, of course, considerable difference in the lengths of time taken by early and by late varieties of the same vegetable, and in addition weather and other growing conditions have some influence. An extremely dry season may make it impossible for you to follow your planting plan exactly, as first crops will be late in maturing and second crops will be late in starting. Incidentally this is one of the things that makes an irrigation system of supreme advantage. With it there are no long-delayed crops, poor in both quantity and quality when they finally get rain enough to mature.

Having gone so far as to map out your work in the garden it will be interesting to see how accurately you can follow the plan and how nearly you can make your actual garden come up to the ideal one you have put down on paper. You will have to get all the plantings made at the proper time. So you should make a check list showing the kinds and the amounts of the various things to be planted and the dates on which they should be put in. Another thing you might put down on your check list is the treatment of the various insect pests and diseases that are likely to attack your crops.

Keep a Garden Diary

In making out your garden plan this year you will probably find yourself handicapped by the lack of accurate knowledge about your plantings of last year—how much of

each thing you used, the dates of the last frost in the spring and the first killing frost in autumn, when the various insect pests appeared, when you made your last sowing for winter vegetables, how long after planting it took the different varieties of vegetables to mature, and a score of other things, all of which you have had to guess at with no degree of certainty. Provide now against next spring. Get a cheap



Keep a record of your garden work for next year's reference.

diary and leave it in the pocket of your work clothes or hang it up in the tool shed. In it jot down from time to time the things you particularly want to keep track of.

Unless you had forethought enough to do it last fall, you must now provide yourself with a supply of soil in which to start your seedlings of vegetables and flowers. For the seed boxes the soil should be very light and porous, but not very rich. On the other hand, soil for transplanting should have

good body and should be made rich enough to enable the seedlings to make rapid and unchecked growth. Soils that are naturally in just the right condition for either purpose can seldom be found. But in most localities one may readily procure materials to make the right mixtures. The first of these is fairly rich garden soil—preferably a sandy loam that has been well enriched for several years but is free from weed seeds. You may have to take a pick and break up a few good-sized pieces of frozen soil, which will thaw out in a box. Also get a supply of old and thoroughly rotted manure. If your hot-bed still contains the remains of last year's heating material, that will be just the thing. The third thing you want is humus, in the form of chip dirt or decayed sawdust or leaf mold. These materials should be allowed to thaw and dry out. They will then be available for immediate use when seed-starting time arrives.

5'	15'	6'
EARLY CABBAGE		
SUMMER CABBAGE		
CAULIFLOWER		
BELL PEPPERS		
MELONS		
ONIONS 4		
EARLY CARROTS		
TURNSIPS		
PARSNIPS 2		
SALSIFY 2		
DWARF PEAS (DOUBLE ROWS) 4		
SWEET CORN 4 (2 VARIETIES-2 PLANTINGS)		
TOMATOES		
POLE BEANS		
POLE LIMA BEANS		
DWARF BEANS 4 4 VARIETIES-2 SOWINGS		
DWARF LIMAS		
PEPPERS & EGGPLANTS 8		
MELONS		
SQUASH SUMMER BUSH		SQUASH WINTER BUSH
CUCUMBERS		WATER MELONS

Plan for a vegetable garden 15 x 75 feet.

February: Second Week

STARTING SEEDS IN GREENHOUSE OR HOT-BED

Early this month the work of actually getting the garden started must begin. Up to now it has been mostly planning and seed buying. But a glance at the garden plan shows that by the time operations outdoors may be begun plants of various kinds, already well started, will be required. The success of the garden throughout the summer will depend to a large extent upon the size and quality of the plants, both vegetables and flowers, transferred to the open ground at the beginning of the season.

The utility of the carefully made garden plan becomes apparent at this stage of the game. The gardener who has not felt like "wasting the time" to make such a plan goes ahead on a guesswork basis, planting enough of the things he thinks he will want to be sure to have abundance; while his neighbor, who has taken the trouble to figure things out accurately, knows just how many plants of each variety he will require and consequently does not waste seeds and time and room. Growing fewer plants, he can give them more room and consequently get them of better quality. The ordinary packet of most things to be started—tomatoes, cabbage, cauliflower, lettuce and so forth—contains more than enough seed to supply an average small garden, but if one has room in the frames any surplus of good plants can generally be disposed of to neighbors and friends at a reasonable profit, giving the grower the additional advantage of being able to select the best for his own use.

The starting point of operations now, as later out-of-doors, is the seed. What is a seed? It is a particle of vegetable matter in which two things have taken place: First, the life force has been temporarily arrested and lies dormant,

ready to react to the proper stimuli from the outside and to become active again. Second, the usual processes of change and decay have also been arrested, and the vegetable matter forming the seed—which must feed and sustain the germ until it develops sufficiently to absorb nutrition from exterior sources—is preserved and kept in good condition.

Certain conditions are necessary for the germination of seeds—heat, moisture and light, the latter not being necessary, however, until the seed has sprouted and shows above ground. The theory that seeds will sprout better in a dark place is probably based solely upon the fact that an even condition of the moisture in the soil is more likely to be maintained in such a place than in the sun. The gardener's problem is not only to give these several conditions but also to supply them in the proper degree for the particular kind of seed he wants to grow.

Getting a Good Stand: The Things Not to Do

The seeds of most of the hardy vegetables are quite cold-blooded—that is, they will start in a temperature in which a more tropical thing will either lie dormant or rot. Radishes, celery or parsley, for instance, will sprout vigorously where tomatoes or eggplants will probably fail to come up at all. Lima beans will rot to the last seed after a rain that will make other seeds sprout quickly. Still other seeds have such hard casings or shells that the seed sprouts, even when heat and moisture are supplied, cannot break through. From this cause cannas, moonflowers and sweet peas sometimes fail to germinate. If the hard outer shell is carefully cut through with a knife or file before planting, this difficulty can be overcome.

As a usual thing seedsmen are careful to send out only seeds that show a fair percentage of germination. If the seeds fail to come up or come up poorly the seedsman is blamed, and next year's order probably goes somewhere else. But here are some of the things that cause failure even when good seeds are used:

DRYING OUT OF SEED BOXES. Seeds, especially small seeds, that are very near the surface, frequently fail from this cause. They may have enough moisture to germinate, but then the soil becomes so dry that the sprout which is beginning to push out from the seed is dried up. Neglect that would do no harm to seedlings an inch or two high will prove fatal to seeds that are just germinating.

COVERING SEEDS TOO DEEP. They are seldom covered too deep to germinate, but often are buried so deep that only a very few are able to push through to the surface, and these are weakened by the struggle.

USING THE WRONG KIND OF SOIL. Ordinary garden soil, especially if it is at all heavy or clayey, is literally too heavy to cover the seeds with. Furthermore, it has a tendency to form more or less of a crust after being watered. For starting all small seeds the soil should be light, and so crumbly that it will not make a crust. Very slight resistance may prove fatal to the tiny seedlings before they get above ground.

TOO HIGH OR TOO LOW TEMPERATURE. Flower seeds, on the average, require a warmer temperature than vegetable seeds. Hardy and half-hardy sorts, such as sweet alyssum and snapdragons, should be given a temperature of about sixty degrees. The warmer things, like salvia, heliotrope and coleus, should be given ten to fifteen degrees more.

POOR DRAINAGE. This trouble, due to improper soil or tight-bottomed flats, causing the soil to stay wet and soggy after watering, will cause many kinds of seeds to rot. Provision for the best of drainage should always be made, so that surplus water can always soak down below the level of the seeds.

CARELESS WATERING. Water applied too freely is likely to wash the dirt so that some of the seeds are uncovered or even washed aside into the corner of the box, and others are covered too deeply. Also the soil is likely to form a hard crust. Even after the little seedlings are up they can be severely injured by careless watering, as they are easily

knocked over flat, weakening the plants and making the stems crooked.

PESTS OF VARIOUS SORTS. Mice will take the greatest of pleasure in going over your seed boxes during the night and rooting out the little seeds. In the frames or greenhouse, slugs are likely to do damage.

The Things to Do

These are things not to do. As to the things to do, the first, of course, is to provide a place to start the seeds. A small greenhouse, a hot-bed, a sunny window in a room in the house, or a cold-frame may be used. The objection to the hot-bed is that you cannot work in it in bad weather and the temperature cannot be watched and regulated as well as in the greenhouse. In the house the atmosphere is likely to be entirely too dry for seeds. The cold-frame cannot be used early enough.

The secret of success is in giving regular care. Watering and ventilation must be looked after every day, particularly as the spring sun grows stronger. During midday the temperature in the frames will run up to an injurious degree if the sashes are left on.

Some gardeners make a practice of sowing the seed directly in the soil, but under most circumstances it is far more convenient to use flats. Seedlings grown directly in the soil are not so likely to dry out if they are neglected, but other advantages of the flats, in moving them about and changing them from one frame to another, more than offset this. Flats may be made quickly and easily from cracker or soap boxes. Those for starting seeds may be made about two inches deep; those for transplanting should be an inch deeper. In putting bottoms on the flats, leave small spaces between the boards, or bore several half-inch holes.

The soil in which the seedlings are started should be spongy enough to absorb and to retain moisture for a long time; porous enough to let any surplus drain through it rapidly; friable enough so that it will never form a crust;

light enough so that any seedlings can push up through it readily, and as free as possible from weed seeds. Such a soil is hard to find—but not difficult to make. Leaf mold or chip dirt rubbed through an ordinary ash sifter, or coconut fiber mixed with a clean, light, sifted soil, with the addition of sand, if it is necessary, to make the whole slightly gritty, will give the desired results. Fill the flats not quite to the top. Be careful to pack the soil firmly in the corners and along the edges.

Careful Watering at All Stages

It is important to have the soil in just the right condition of moisture when the seeds are planted. To be sure of this, water thoroughly the day before planting, or set the flat in a pan of water so that it can soak up moisture from the bottom, or water the flat thoroughly when it is about two-thirds filled with soil, putting on the surface layer afterward—in which case it will become moist clear to the surface without getting muddy or sticky.

Make tags for the various things you expect to plant. Then you will be in no danger of getting them mixed up. Mark off very shallow furrows about two or three inches apart. Most of the vegetable seeds go in about a quarter of an inch deep; most of the flower seeds, which are very small, should be barely covered. Very small seeds, like those of the begonia, nicotiana, mignonette or portulaca, should be merely pressed into the surface of the soil with a small piece of board and covered with a few pieces of shredded moss or leaf mold laid upon the surface to shade them until they are up. Sow the seeds as evenly as possible and not too thick, even if you have some left over in the packet. Then press them into the soil lightly with the forefinger or the edge of a thin board, and cover them lightly with soil, pressing it down firmly but not hard. If the soil has been prepared as suggested, watering immediately after planting will not be necessary. If watering is required, either right after planting or at any time before the seeds

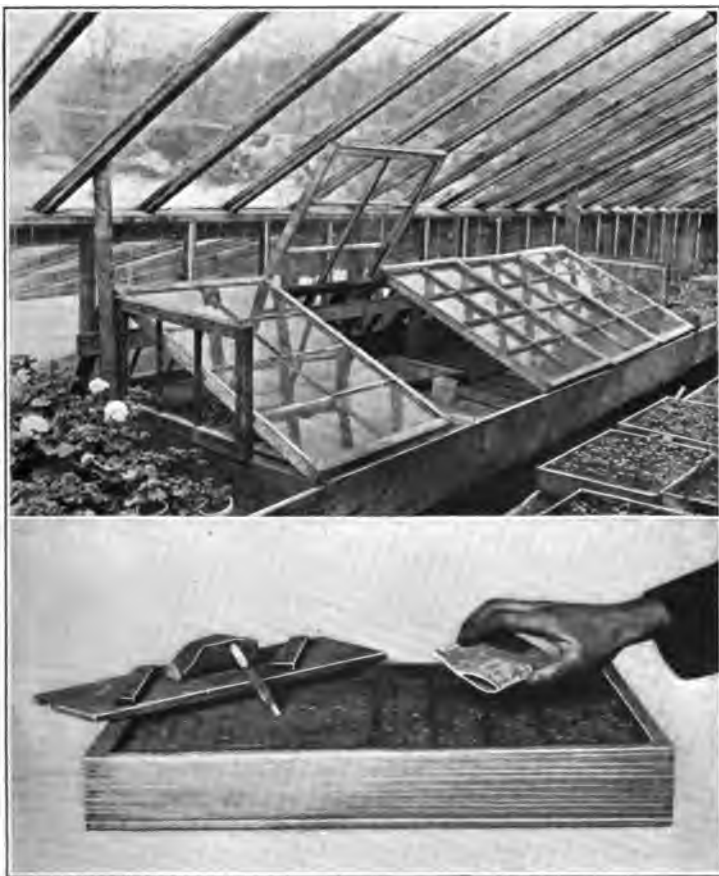


PLATE 1.—If you have only a small greenhouse with no “warm section” here is a way of rigging up a frame in which to start things requiring a higher temperature than the house affords,—such as cucumbers, melons and tender flowers. (*Lower*) This shows the method of preparing a flat for the sowing of fine seeds; if they are very small, it is best to distribute them direct from the packet, by tapping it gently with the finger. A board and marker shown on the left are convenient in getting the soil in the flat smooth and level and in marking off the little furrows for the seed.



PLATE 2.—There are a number of factors which help to determine how deep seeds should be covered. As a rule, very small seeds, such as lettuce or onion, are covered $\frac{1}{4}$ – $\frac{1}{2}$ inch (see 2 above); medium sized seeds like beets or melons are covered $\frac{1}{2}$ – $\frac{3}{4}$ inch deep (see 1 above); and large seeds such as beans and peas are covered 1 to 2 inches deep (see 3 above). “Double” rows,—two single rows, six inches or so apart, are often used, especially for peas (see 4 above).

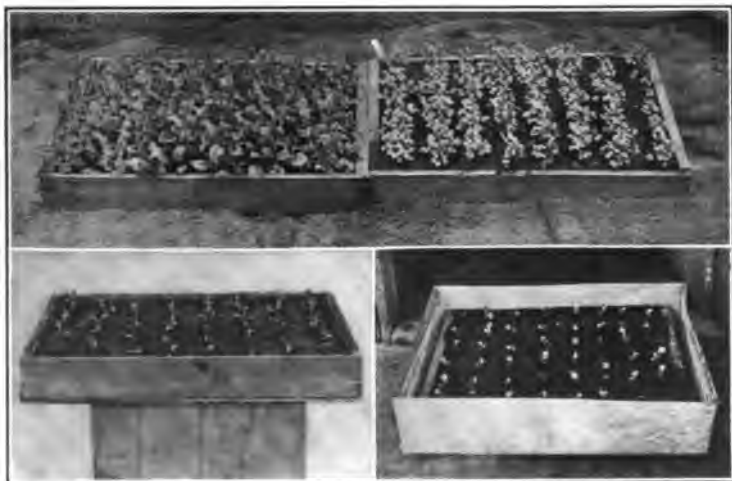


PLATE 2.—The art of starting plants early under glass for transplanting later is one of the most important things the gardener has to do. Getting a “good stand” of seedlings is only the first step. One of the things to be guarded against particularly is letting the little seedlings get too large before they are transplanted. The plants shown in the right hand corner are ready to transplant. The second true leaves are just developing. Those in the upper left hand corner have been allowed to go a few days too long and have become tangled and have grown up spindling. In the lower left hand corner is shown a flat of little plants just transplanted. The best way to water them after the operation is to put the whole flat in a tub or a pan like that shown in the lower right hand corner and then to add enough water to saturate the soil in the flat thoroughly from below. As soon as the soil begins to appear moist on the surface, lift the flat out. In this way the soil is soaked thoroughly without in the slightest degree injuring the little seedlings.

are up, it is best to do it by placing the box for half an hour or so in a shallow pan of water. If this cannot be done use a very fine spray, or water through a piece of moist burlap.

As already explained, it is most important to keep the surface of the soil from drying out until after the plants are well started. To do this, a pane of glass or a sheet of newspaper—preferably the glass—laid over the box, and tilted up a little at one edge to admit fresh air, will prove very helpful, as it will retain moisture that would otherwise pass off into the air. Germination will be quickened and strengthened if bottom heat can be given. For a single flat or two the simple forcing device described on page 340 will prove very helpful.

As soon as the little seedlings are up they must be given an abundance of light at all times, and they should have ventilation every day that it is not too cold. Air should be admitted so it will not blow directly upon the plants. The soil should be watched carefully and watered as soon as it begins to dry out, as indicated by its beginning to look light and powdery on the surface. Subwatering, if it can be used, is the best method to employ. A galvanized tin tray may be made at small cost by any tinsmith or plumber. This is made two to three inches larger in each direction than the flats, which are set in it in enough water to saturate the soil thoroughly without making it wet.

How to Transplant Seedlings

When a seedling begins to show its third true leaf it is large enough to transplant. The little plants should always be moved before they crowd one another. The flats for transplanting should be prepared in much the same way as those for the seed, except that a layer of heavier, richer soil should be used, and a layer of old rotted manure should be put in the bottom of each flat. If manure is not available two or three quarts of bone flour or bone flour and tankage should be thoroughly mixed with each bushel of soil used, preferably a week or two in advance.

If the soil in both seed flats and transplanting flats is watered thoroughly a day in advance, it will be in the right condition for good work. In taking the little seedlings from the seed flats lift them out in a clump and separate them gently with the fingers, taking care to disturb the fragile rootlets as little as possible. In the transplanting flat make a small hole with the forefinger or a small pointed stick, lower the little seedling into it until the greater part of the stem is covered, and with the thumbs and forefingers press the earth firmly about it. After transplanting give a thorough watering and keep the plants shaded from the hot sun for a few days giving only an occasional sprinkling, if necessary, to freshen up the plants until growth is renewed, as it should be at the end of a few days.

Some six to eight weeks before it is safe to plant outside—during the latter part of February in the latitudes of New York, Chicago and Kansas City—the hot-bed should be filled for action. Even if you have not a hot-bed frame already on the place it will not be necessary to forego its advantages this spring. One may be purchased knocked down and ready to go together with a few bolts and half an hour's work. If necessary the bed may be made on solid, frozen ground.

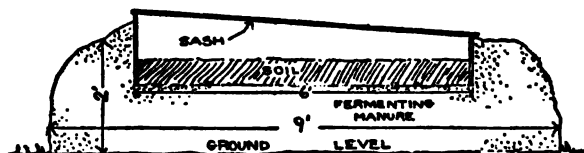
If you are going to make a new frame pick out the sunniest and most sheltered place possible for it. A bed started early should be equipped with mats or shutters as well as glass sashes, so it may be given extra protection on very cold nights. Doubleglass sashes cost more, but do not require so much protection and have the great advantage of keeping out the cold without shutting off the light.

Whether you make the hot-bed on the ground or in a pit the vital point is the heating material. Sometimes frames built directly against the house, or near the greenhouse or garage, may be heated by hot-water or steam pipes from the near-by boiler, or even by warm air from the cellar. In the great majority of cases, however, manure must be relied upon. To produce satisfactory results this must be of the right kind and must be carefully handled. Procure

clean, fairly fresh horse manure, and unless it has already a good quantity of fine bedding mixed through it get rotted leaves to the bulk of half to two-thirds of the manure. Mix the two thoroughly to form a compost, and tramp it down as firmly as possible in a compact heap, preferably under a shed or cover of some sort.

In a few days, when the mass begins to steam, it should be forked over and made into a new pile. Tramp down each layer and build it up compactly, as before, and if it seems to be drying out add enough water to keep the whole moist, but not wet. Remake the pile, if possible, on a warm day.

When the compost is ready put it in place to a depth of about fifteen to twenty-four inches. Half a cord will be



sufficient for a three-sash frame, unless it must be placed on the frozen ground. Then a little more than twice the first quantity will be needed. It should be spread out in a broad, low heap, nine to ten feet wide, eighteen to twenty-four inches deep, extending a foot and a half or so beyond the ends of the frame, and banked up round the frame. In making a bed of this sort it will be necessary to buy some soil at a florist's or market gardener's. The manure should be tramped down thoroughly and allowed to begin active fermentation again. After a few days the soil may be put on to a depth of four to six inches. Then, unless you are in too great a hurry, give a good watering and leave the sashes on a few days to let the soil warm up and to give some of the weed seeds a chance to sprout. The soil will then be in a good condition to mix with chip dirt or leaf mold for use in the seed flats.

One of the secrets of growing early crops in the frames successfully is to have the soil rich in available nitrogen.

Old, thoroughly decayed manure mixed thoroughly with the soil will supply this and will also help to make the soil light and warm. One or two top-dressings with nitrate of soda after the plants begin active growth will also produce visible results. Plenty of water is another essential.

February: Third Week

PLANS FOR THIS YEAR'S FLOWER GARDEN

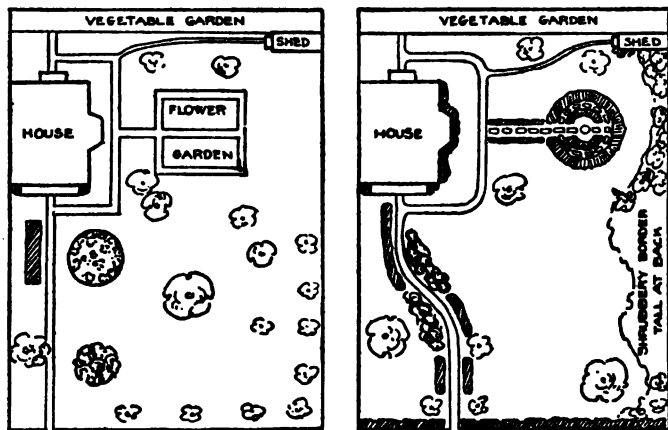
If it pays to plan the vegetable garden carefully because of the greater efficiency that results, the careful planning of the flower garden is of no less importance. The effectiveness of your flower garden will depend more upon how you arrange it than upon what goes into it.

However, planning the flower garden is a process just the reverse of planning the vegetable garden. With the vegetables your aim is to get as many as possible of them into the space at your disposal. With the flowers, on the contrary, you begin your plan by deciding definitely the result or the picture you wish to create, and then select your materials accordingly. Don't say to yourself: "I am going to have two dozen pink geraniums, three dozen pansies, a hundred asters and some of those beautiful new begonias from the florist's; then there will be the castor-bean plants, the pinks and the new hollyhocks and the other things we are starting in the hot-bed—where shall we put them?" Looking at it the other way round, say to yourself, for instance: "What would be a good thing to put there beyond the end of the veranda, where the wing of the house makes a tall, blank wall?" The answer may be hollyhocks or golden glow (rudbeckia), or delphinium or helianthus, or any of several other things. The point is that you want to be free to make your choice first, and select the plants afterward, rather than to get the plants and fit them in as best you can.

Creating an Appearance of Space

In planning your flower beds you should go a step farther. Remember that just as the flowers should be made a subor-

dinate part of the flower bed or border, so the beds, borders, lawns and the other features of the place should each be subordinate to the whole. Don't be afraid that this is too nearly a professional task for you to accomplish. You will achieve more satisfactory results by working in the right direction, even if you make many mistakes, than if you work in no direction at all. It is almost always desirable to create an appearance of roominess about a small place. One of the most important points to be remembered is to keep an open center, so far as possible, by keeping tall things



In planning your place, do not scatter shrubs and flower beds all over. Keep an open stretch of lawn.

back along the boundary line, and also to avoid straight and definite terminations of paths, roadways and vistas, so that the suggestion of something beyond may be created at every point.

The materials available from which you may construct your flower garden belong to three classes: Hardy perennial plants; potted bedding plants, which are usually obtained from the florist or may have been started from seed in your frames or small greenhouse; and plants from

seed sown in the open, either transplanted or left where they were started.

The potted plants, which are usually in bloom when you get them, give you the biggest immediate show for your money. But most of them are good for only a single season, so that in the end they are the most expensive to buy. Hardy perennials of many good sorts cost from fifteen to twenty-five cents apiece, and most of them will bloom the first year if planted early enough in spring; they will last for many years. Annuals and biennials, and perennials that are treated as annuals, started from seed, cost next to nothing, and are almost always satisfactory if care and judgment are used in selecting varieties adapted to the particular places in which you wish to put them, or combinations in which you wish to use them.

Flowers Available for Special Purpose

The catalogues list hundreds of kinds and varieties of flowers, but very few of the kinds that are not well known are as good as the popular favorites that everybody has grown or seen. Some of the flowers to be started are hardy and others are half hardy or tender, so it is best to have some place arranged in which the latter can be given a little higher temperature.

When the plants are up and far enough along to be transplanted—when the second or third true leaf begins to show—they should be shifted to other flats or to pots. Plants of which a comparatively large number will be required, such as pansies, asters and sweet alyssum, may be grown in flats until it is time to set them out.

If the seedlings are extra strong and well started, as the result of not having been crowded in the early stages of growth, they may be put at once into small pots. These things should be given a second shift and, if the pots become filled with roots, a third shift to larger pots before being set into the garden. This is especially true of salvia and other tender plants that cannot be set out until all danger of

frost is past. Figure out as closely as you can the number of plants of each kind you are going to want, so that when you are transplanting there will not be a surplus of things for which you will have no use later.

A GOOD LIST OF FLOWERS FOR THE GENERAL GARDEN

FLOWER	DISTANCE BETWEEN PLANTS, INCHES	HEIGHT, INCHES	COLOR	IN BLOOM
Ageratum.....	6-12	12	Blue, white	June to frost
Aster.....	12-24	18-30	Various	July to Sept.
Balsam.....	15-20	12-18	Various	June-Sept.
Calendula.....	12-18	18-24	Orange, yellow	June to frost
California Poppy.....	6-8	12-15	Orange, yellow	August
Campanula.....	8-12	18-36	White, blue, pink	June-August
Candytuft.....	4-12	6-18	White to crimson	June-Sept.
Cornflower.....	8-12	12-40	White, blue, lilac	June-August
Cosmos.....	24	2-8 ft.	Pink, white, red	Aug. to frost
Dimorphotheca (African Daisy).....	6-10	12-15	Pure white, yellow Orange, salmon	June to frost
Foxglove.....	10	12-36	Pink, white	June
Hollyhock.....	12-18	3-7 ft.	Various	August-Sept.
Lobelia.....	4-8	6-18	Blue, white	June-Sept.
Lupine.....	4-8	12-24	White, blue, pink	May-June
Marguerite Carnation.....	6-12	12-18	Various	June-Sept.
Marigold.....	6-18	10-36	Golden yellow to orange	July-Sept.
Mignonette.....	6	12-18	Golden to reddish yellow	July-Sept.
Morning Glory.....	4-12	10-20 ft.	Various	July to frost
Nasturtium.....	5-12	1-5 ft.	Various	July to frost
Pansy.....	6-8	6	Various	May-June, Aug.-Sept.
Petunia.....	8-12	12-24	White to ma- genta, mixed	July to frost
Phlox Drummondii.....	8-12	12-36	Various	July to frost
Poppy.....	4	6-10	White to scarlet	August-Sept.
Ricinus (Castor-Oil Bean)	24-36	4-7 ft.	Foliage	July to frost
Salpiglossis.....	6-12	12-24	Various	July to frost
Salvia.....	6-12	12-36	Scarlet	July to frost
Stock.....	6-12	12-24	Various	June-Sept.
Sweet Alyssum.....	4-8	8-10	White, lilac	May to frost
Sweet Pea.....	4-8	2-6 ft.	Various	June-Sept.
Sweet William.....	6-12	12-18	White, pink, red	July-August
Verbena.....	12-18	6-10	Various	July to frost
Zinnia.....	8-12	12-24	Various	July to frost

February: Fourth Week

MAKING THE SOIL RICH: MANURES; FERTILIZERS; AND HUMUS

A poor soil cannot support a good garden. The foundation of the gardener's success must be a rich soil. Ignorance or neglect in preparing the soil is more often the cause of failure in the home garden than any other one thing. To the beginner the work of getting ready to plant always seems an irksome but necessary evil. But the gardener who is tempted to skimp the preliminary part of his work should make himself familiar with some of the things that influence plant growth; then he will realize the importance of giving his best attention to this part of his work.

Almost every gardener in these days knows that his soil must be well supplied with plant foods—nitrogen, phosphoric acid and potash—if he is to get good crops. But a little knowledge of this kind, if not a dangerous thing, is a next to useless thing. The gardener who wants to make sure of good results must take the trouble to go deeper. Then he will find, not only that he must furnish plant foods to his crops but that they must be in certain forms called “available” and in certain proportions to one another; that there must be sufficient soil moisture present or the richness of his soil will count for nothing; and that all these things will be affected directly or indirectly by the physical condition of his garden soil and the way in which he handles it.

“Available” plant food is plant food existing in the soil in such forms that the plant roots are able to take it up or absorb it. Just as raw beefsteak or uncooked beans have to undergo certain changes before they are available as human food, so most of the forms of nitrogen, phosphoric

acid and potash existing in the soil, and many of those added to it in manures or fertilizers, have to undergo certain changes, which take place in the soil, before plants can use them. Certain degrees of heat, of moisture and of air make these changes.

All plants require for their sustenance a number of different elements in the soil. Of these the only ones that are likely to become deficient are the three already mentioned—nitrogen, phosphoric acid and potash. The worst of it is that if any one of these begins to get used up the plant will stop growth instead of using more of the other things. The kind of plant food that has become exhausted is termed the "limiting factor."

A "complete fertilizer" is one that contains all three of the plant foods mentioned, though they may not be in the proportions required. As a matter of fact most of the complete ready-mixed fertilizers to be bought, and especially the cheaper grades, do not contain the plant foods in the best proportions for general garden use. A good general garden fertilizer contains four per cent of nitrogen, eight per cent of available phosphoric acid and ten per cent of potash. Potash is temporarily scarce at the present time, as no potash salts can be imported from Germany, and the percentage of potash in all fertilizers is being cut down.

Both Water and Air Needed in the Soil

After a soil has been well supplied with plant foods in available forms the plants cannot grow unless they can absorb the various elements in the form of solutions. That means that a certain amount of moisture must be present in the soil. Conditions are most favorable to growth when the soil is about half saturated. Air must be present as well as moisture. If the soil is wet the air is excluded. If it is dry the plants cannot get hold of the food lying about them.

The practical problem remains of just how to make the garden properly rich. Manures vary so much that they

may be worth several dollars a load or not worth the hauling. Fertilizers may or may not be of benefit in any particular case. What would be thorough preparation of the soil in one garden would be just the wrong thing in another.

Following are the materials available for enriching the small garden, with a few statements as to comparative advantages and disadvantages of each. The gardener should remember, however, that the greater the variety he can use, as a general thing, the better.

Whenever it can be obtained at a reasonable price, good, well-rotted stable manure makes the best foundation for the garden. The great value of manure as a fertilizer lies in the fact that it not only adds plant food to the soil, but also contains vegetable matter or humus, which is necessary to keep the soil in good physical condition—loose and crumbly—so that it is capable of absorbing and holding the greatest possible amount of water without becoming sticky and lumpy and excluding air. It also increases the action of the various bacteria that help in the processes of changing unavailable to available plant food, and, in the case of such crops as beans and peas, of gathering nitrogen from the air. Good manure should be so well rotted that it is fine and crumbly, but not in lumps. It should be evenly moist all through, neither sopping wet nor so dry as to be fluffy. If you cannot obtain manure that is already thoroughly rotted place what you do get in a compact pile and tramp each layer down hard. In this way fermentation may be hastened and the manure rotted thoroughly in quite a short time. Manure that is fermenting or fermented should always be kept in a well-packed pile until you are ready to fork it into the ground. If it is spread out, or left loose, it loses a great deal of its value.

An excellent plan is to place in a hole any manure that you do not need for immediate use. To this should be added, from time to time, any house or garden refuse that will rot—various vegetable trimmings, old sods, weeds that have not gone to seed, or anything of similar nature. This may be kept in much the same way as a smoldering fire,

and the fermentation never allowed to stop. In using compost from this heap enough should always be left, if possible, to keep it "going."

Manure is good for both light and heavy soils and for most crops. It is rich in nitrogen, but phosphoric acid and potash should be added from other sources. Get it well mixed under the soil of the garden, or it will interfere throughout the season with the various other operations of planting and cultivating. Where it is impossible to obtain manure, commercial humus may be used, in connection with fertilizers, to maintain the humus content in the soil.

How to Buy Fertilizers

Actual plant foods may be bought more cheaply in commercial fertilizers than in manure. But these have no practical effect upon the physical condition of the soil and add no humus. They may be classified in three separate groups, which the gardener should learn to distinguish and to use according to his need: First, ready-mixed complete fertilizers; second, the raw materials or original sources of plant food, which are used largely for making the mixed goods; and third, indirect fertilizers or soil improvers or amendments, such as lime and gypsum. All these things vary greatly both as to amount of plant food contained and as to availability of that plant food. Most gardeners buy the ready-mixed complete fertilizers, getting a bag, or several bags, as may be required by the size of the garden. This is the easiest way, but it is also the most expensive. Whether it will pay you to get your fertilizers in that form or to get the materials and mix up your own will depend upon how much time you may have and how much fertilizer you use. The saving, if you use the latter method, will amount to thirty to fifty cents a hundred-pound bag.

If you buy the ready-mixed sort, however, remember the higher the price a ton, as a general rule, the less the cost of the actual plant food. You can see, if you stop to think a minute, that it is cheaper to buy two hundred pounds

of a 4-8-10 fertilizer at \$2 a hundred than it is to buy four hundred pounds of a 2-4-5 brand at \$1.60 a hundred. Not only would the former lot, costing \$4, contain as much actual plant food as the latter, costing \$6.40, but it would be much easier to move it round and put it on your garden, and better materials would have been used in making it.

Saving in Home-Mixed Fertilizers

Making your own fertilizer is not a difficult task. Nitrate of soda, dried blood, tankage and cottonseed meal are all used as sources of nitrogen. Phosphoric acid may be had in high grade in acid phosphate. Potash may be had in muriate or sulphate of potash. All these things are standard commercial products, with uniform percentages of plant foods contained, and it is therefore not difficult to figure out any formula you may desire to use. A mixture of nitrate of soda, muriate of potash, high-grade tankage and high-grade acid phosphate, in the proportions of thirty, forty, fifty and seventy pounds respectively, makes a high-grade complete fertilizer with an analysis approximately of four per cent nitrogen, eight per cent available phosphoric acid, ten per cent potash. Twenty pounds of nitrate of soda, thirty pounds of Peruvian guano, forty pounds of muriate or sulphate potash and eighty pounds of acid phosphate will give about the same formula.

The operation of mixing the materials together is not a difficult one. Weigh out, or estimate carefully, which will answer practical purposes, the several materials; break up any lumps with a mallet or the back of a shovel; spread the several layers on top of one another on a tight floor or in a large shallow box; mix thoroughly with a square shovel or a hoe; and sift through an ordinary coal-ash sifter or a small screen. If you have several hundred pounds of the mixture it may be stored conveniently in cracker boxes, which hold a hundred pounds each when not quite level full. Keep in a dry place.

When buying your fertilizers buy enough bone flour and

nitrate of soda, in addition to what you will want to use in preparing your garden, so that you can use them as a top dressing throughout the season. Fifty or seventy-five pounds of bone flour and twenty-five or fifty pounds of nitrate of soda will be enough for the small garden. They are equally useful for flowers, lawns and shrubs, and for small fruits and vegetables.

Fertilizers should be applied broadcast after the ground has been plowed or spaded and then thoroughly harrowed or raked in. From 100 to 250 pounds to a space of fifty by one hundred feet should add plenty of plant food to your garden. If manure is used, or the ground is in good condition, less may be used.

Most soils, whether light or heavy, that have been under cultivation for some time need lime. If wild sorrel grows freely about your garden you need lime. Or you can get a little blue litmus paper at the drug store, moisten it, and insert it in a slit in your garden soil; if it changes to pink or red use lime freely. This may be put on two or three times as thick as you would put fertilizers.

The best form of lime to use, especially at this time of the year, is ground, raw limestone, which is not caustic in its action. This should, however, be so fine that much of it is like flour. It should not cost you more than fifty or sixty cents a hundred pounds. Put the lime on as early in spring as possible.

March: First Week

BUSH AND TREE FRUITS FOR THE SMALL PLACE; QUANTITIES NEEDED; GOOD VARIETIES

No garden is complete without fruit—not only the small fruits but, unless it is a very small garden indeed, some of the pome and stone fruits, such as apples, pears, peaches, cherries and plums. Sometimes it is argued that the latter take too much room. As a matter of fact, blackberries and raspberries take more space in proportion to what one gets from them than need be given to dwarf or trained fruit trees.

Most of the small fruits will survive any adverse conditions they are likely to encounter. In fact, many gardeners would obtain better results if the bushes were not so hardy. A currant bush set out by the garden fence, where it will survive for years even if it is not cared for, is more likely to be neglected than the newly set strawberry patch, which must be tended for a season at least if one expects to get any crop from it. It is the same principle that prompts a gardener to coddle and nurse through the winter a tender tea rose, while an equally beautiful but perfectly hardy rose will be stuck up against the house wall and left without so much care as spring pruning.

Aside from the fascination of growing it, there are practical reasons why fruit should be given a place in every garden. Most fruits, being highly perishable products, cost the consumer a very high figure in proportion to the expense of growing them. Not only can he produce them for himself a great deal cheaper than he can buy them, but the fruit will be of very much better quality. Fruits deteriorate after picking even more quickly than most vegetables. There is very little danger of overproduction. Prac-

tically everything in the fruit line can be preserved to advantage.

Unlike the vegetable garden the fruit garden need not have a space of considerable size devoted exclusively to it. The trees may be put round the edges of the place, and a dozen or so cane fruits may be placed along a wall or in a corner. Most of the fruits on a very small place may be made to fit in with the general decorative scheme; many of them in bloom are fully as beautiful as flowering shrubs.

A variety of material is available for the fruit garden. Strawberries, raspberries, blackberries, dewberries, loganberries, currants, gooseberries and grapes make up what are usually known as the small fruits. Apples, plums, peaches, cherries and pears may be had either in the regular standard types or, if space is limited, on dwarf stocks which, with proper care, give miniature-sized trees with full-sized fruit. Of most of these things you will want two or more varieties to assure a succession, but the number of each required, even for a fair-sized garden, will be very small.

Plant the Fruits by Proxy

The ideal way not to plan the fruit garden is the way it is frequently done. The gardener, having decided that he really must have some fruits in his garden, does nothing more about it until the nursery agent gets round and persuades him that he needs a quarter of a dozen, half a dozen, or a couple of dozen of this, that and the other thing which will be shipped in plenty of time for planting. Some agents have first-class stock for sale. But there is a much better way of planning your fruit garden.

Take a number of labels, short stakes, or pieces of shingle and figure out carefully what you want to have, so far as the room at your disposal will allow. The bed for strawberries or cane fruits may be staked off. The bush fruits and fruit trees may be indicated by stakes, each with a name written on it. After you have thus planted your

garden by proxy, you can make up a thoroughly satisfactory garden order that will just fit your place.

Here are the distances to allow for the different kinds of fruits: Strawberries, one foot by one foot or two feet, each way; in rows two feet apart; in beds of three or four rows, the plants a foot apart each way, with two-foot alleys between if the hill system is to be used, or a foot apart in rows three feet apart if you expect to grow them in matted rows. Raspberries, three by six feet. Blackberries and dewberries, five by seven feet. Currants, four to five feet apart. Gooseberries, five to seven feet. Grapes, six to eight feet.

A standard apple tree, when grown, will occupy a space some thirty to forty feet in diameter. But apples grafted on doucin stock may be set as close as sixteen to twenty feet, and on paradise stock, which is still smaller, as close as eight to ten feet. Plums, cherries, pears, quinces, and dwarf pears on quince stock may be put from ten to twenty feet apart, depending largely upon the varieties and the way they are pruned.

Practically all the fruits will do well in any good garden soil, but they have some preferences. The cane fruits, for instance, are partial to rather clayey soil, and, if there is any choice, give the drier place to the strawberries, as they suffer less from insufficient moisture than do the raspberries and blackcaps. Currants and gooseberries must have plenty of moisture to do well. If they cannot be given a really moist soil they are frequently benefited by mulching before the advent of dry weather. Strawberries will do well even on light, sandy soil provided they do not suffer from drought.

Most of the tree fruits prefer a calcareous soil, but one and all must have good drainage. This is important for the vegetable garden, but it is doubly important for any plants that stay in the ground over winter, as the fruits do. Good fruit and wet feet are not to be found together on the same bush, tree or vine. In planning a garden do not lose sight of the fact that though all these things are small when you set them out, some of them will require a great deal of room, not only horizontally but vertically as well, when they are

fully grown. Place them so that they will not interfere, or will interfere as little as possible, with the care and cultivation of your vegetable garden or flower garden, particularly in casting too great a shade where it is not desired. The smaller sorts may often be tucked in between the larger ones. Peaches, for instance, are often planted between apple trees, as they are comparatively short lived.

Satisfactory Fruit Varieties

Having decided how many of each of the various things you will require, the next step is to select the varieties. Very often the gardener who becomes enthusiastic about one particular good thing makes the mistake of getting all of that sort. Early and late sorts, to afford a succession, should be chosen. Some of the best varieties of the different things follow:

STRAWBERRIES. Early Ozark, a fine new early; Michel's Early, a standard sort but not of the best quality; Early Jersey Giant; second early—Sample and Glen Mary; medium to late—Marshall, Brandywine, Nick Ohmer; late—Lovett, Fendall, and Chesapeake.

RASPBERRIES. The King, extra early; Cuthbert, Columbian, Reliance, all good sorts; Cardinal and St. Regis Everbearing, excellent newer varieties—the latter, after the regular crop, fruits again at the end of the season. The red sorts are generally preferred, but at least one of the black-caps, of which Palmer, very early, Gregg, and Cumberland, are all good varieties, should be included. The standard yellow is Golden Queen.

BLACKBERRIES. Mercereau is an extra-fine new early, and Early Harvest and Early King are both good-bearing sorts. Wilson, Jr., Snyder, Erie and Kittatinny are all good.

CURRENTS. Fay's Prolific and Perfection are two excellent red sorts. White Grape and Lee's Prolific, black, are very good varieties that are favored by many and are excellent for cooking and preserves.

DEWBERRIES are quite similar to raspberries but are a

little earlier in ripening. Premo is a new early sort, and Lucretia is the largest and sweetest.

GOOSEBERRIES. These are of two distinct types, the native and the English sorts. Of the former Downing and Houghton's Seedling are perhaps two of the best. Of the English sorts Industry is perhaps the best suited to our climate. Golden Prolific and the Pearl, pale green, are fine for eating raw.

GRAPES. These should be selected for color and season. Among the best of the black are Campbell's Early, Moore's Early, and Worden, which is extra large and fine. Concord, Wilder and Eaton are good medium-to-late black sorts. Of the red, Brighton is early, Catawba medium, Delaware and Iona late. Of the white, Moore's Diamond and Green Mountain are good early sorts, and Niagara, Empire State, and Pocklington are medium to late. The latter is really a pale golden yellow instead of white; it is extra large and juicy and one of the most delicious of all grapes.

An order of small fruits for an average-sized garden might contain the following:

	VARIETY	NUMBER
Strawberry.....	Early Ozark.....	100
	Marshall, midseason.....	100
	Lovett, late.....	100
Raspberry.....	The King, red, early.....	6
	Cardinal, red, late.....	6
	Cuthbert, crimson.....	6
Blackberry.....	Munger, black.....	6
	Mercereau, early.....	6
	Erie, main.....	6
Dewberry.....	Premo, early.....	6
	Lucretia.....	3
Currant.....	Perfection, red.....	8
	Lee's Prolific, black.....	2
	White Grape.....	2
Gooseberry.....	Downing, pale green.....	1
	Red Jacket, red.....	1
	Industry, red.....	2
Grape.....	Moore's Early, black.....	1
	Concord, black.....	1
	Green Mountain, early white.....	1
	Delaware, red.....	1
	Catawba, dusky red.....	1
	Pocklington, golden.....	1

A few of the best standard varieties of the tree fruits are mentioned below, but if you intend to plant any number you will do well to get the advice of your state experiment station as to varieties best adapted to your particular locality.

APPLES. Summer: Early Harvest, Red Astrachan. Autumn: Gravenstein, McIntosh Red, Porter. Late autumn: Snow, Hubbardston, Pound Sweet, Wealthy. Winter: Spitzenberg, Delicious, Winesap, Jonathan, Baldwin, Roxbury Russet.

PEARS. Among the best of the pears are Wilder, Clapp Favorite, Bartlett, Seckel, Winter Nelis.

PEACHES. Greensboro and Mayflower are good extra early sorts, and Champion, Elberta, Ray and Late Crawford are standard medium-to-late varieties.

PLUMS. Of the native sorts, Milton, Early, Wildgoose, Whitaker and Wayland, late, are good. Bradshaw, Reine Claude and Damson are good European sorts. Of the Japanese plums, Abundance, Burbank and Wickson are all very fine. The Japanese plums, though giving quicker and better results at first, are likely to be much shorter lived than the native of European sorts.

CHERRIES. There are two classes, sweet and sour, the latter being somewhat hardier, especially in the North. Of the sweet, Black Eagle, Black Tartarian, Windsor, Governor Wood, and Yellow Spanish are among the best. Of the sour, Early Richmond, Montmorency and English Morello will give a succession of fruit.

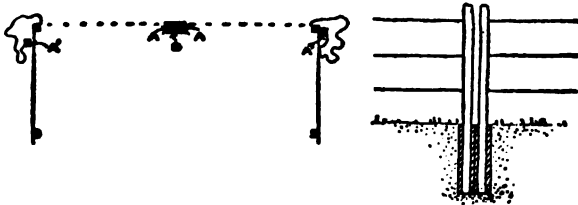
Buying Fruit Trees and Plants

In buying fruits for the home garden, where quick returns are appreciated and only a comparatively small number of trees will be wanted, it will pay to get first-quality stock. And you should get it from the most reliable source you know of.

Before the frost is all out of the ground in the shady spots, the impatient gardener whose frames are already getting

overcrowded with plants will be trying the soil with his spade or digging fork. How soon should the ground be worked? The answer cannot be given by the calendar. It depends entirely upon the season and the character of the soil to be used.

Some soils can be dug safely and planted before the frost is all out; others must wait till long afterward. After thawing, the ground must undergo a drying-out process to some extent before it should be handled. If one attempts to plow it before it is in the proper condition injury that will last for



If your garden is small, make the end fence movable to facilitate plowing and harrowing.

a number of years may be done. The safest rule is "when the soil is dry enough to crumble."

Light, sandy soils, especially when located on a slope where heavy rains have a chance to drain off, may be planted to such hardy things as peas or sweet peas as soon as it is possible to get a few inches of the surface into condition. Heavy soils, or soils lying level with hard subsoils, should not be touched until they are dry enough to crumble away from the plow.

When it is possible deep plowing is almost always more satisfactory than working the soil by hand. Often in a small garden the fence at the ends can be made removable so a horse can get about. Heavy galvanized wire may be used for this fence, with either square or round posts and square wooden boxes or drain tiles as post holes.

March: Second Week

GROWING STRONG PLANTS FOR VEGETABLE AND FLOWER GARDENS

The success of the early vegetable garden and the appearance of the flower garden throughout the season will depend very largely upon the quality of the plants you have ready to set out. Good plants do not make success certain, but they make it very easy. Poor plants are always a great handicap and usually result in failure.

Most people judge a plant's value by its size. This is a point to be considered, but it is by no means the most important one. A plant in healthy growing condition will soon catch up to and pass a plant originally two or three times its size but in poor condition. "Good growing condition" is a state rather difficult to describe in words, but it is one that anyone who handles many plants quickly comes to recognize. One of the indications is color, most plants being of a dark, healthy-looking green. Another is firm, compact, sturdy growth and general "perky" appearance.

If your plants look pale and washed out; if they have brown leaves or are spotted; if they grow tall and lanky; if they incline to droop and drop their leaves, it is a pretty sure sign that something is radically wrong and you should find the trouble. It may be bad air, or starvation, or too much or too little water, or too high or too low temperature, or insects or disease of one kind or another. Whatever it is, don't let it go in the hope of having the plant get over it and come out all right. Unless you remedy the adverse condition immediately your plant is pretty certain to come out all wrong.

There is another condition, not so easily discerned, that makes plants less desirable for setting out—a general

hardening of the stem and roots, which may result from checking the growth by giving too little water, too low temperature or too little room. This puts the plants in a semidormant condition from which it takes them some time to recover, even after they are placed in a more favorable environment. The growing parts of the plant, both above and below ground, should be firm, but juicy and rather brittle. When they become tough and wiry the development of new plant tissue is checked.

Factors That Affect Growth

Various factors influencing the growth of plants—food, water, air, light, heat and protection from insects and disease—are all, in the case of plants being started early in the greenhouse or hot-bed, pretty much under the grower's control. This is at the same time an advantage and a disadvantage, for while he is independent of the vagaries of temperature and insufficient rainfall, Nature cannot help him if he forgets to attend to anything himself. Anyone who expects to grow plants of prime quality should make himself familiar with each of these things that affect growth:

Food. For plants started early, when rapid but sturdy development is wanted, food should be given in highly available forms but in a balanced ration. Too much nitrogen is likely to result in oversucculent or flabby growth. Soil for transplanting or potting up should be much richer than that for seedling plants. Nothing is better than the old stand-by, well-rotted manure, but it should be particularly well rotted and also finely pulverized.

If fine enough and dry enough the manure may be mixed with the soil, but often it is more convenient to put a layer of manure in the bottom of the flat or pot and cover this with the soil in which the plant is to be set. If the manure to be used in the bottom of flats is left in a lumpy condition the plants may grow as well, but in taking them out the roots will be damaged much more than if the manure had been run through a sieve. When stable manure cannot be

obtained commercial horse or cattle manure may be used. Remember, however, that these are dried and concentrated, and do not use too much.

For most purposes, bone flour, if no manure is available, will give very satisfactory results. Peruvian guano, if the genuine article can be obtained, is one of the best materials, being not only rich in organic nitrogen but having also generous amounts of available phosphoric acid and potash. In using bone flour or dried blood or tankage it is desirable to mix wood ashes with the soil. In fact wood ashes may almost always be used to advantage in preparing soil for the growing of plants, as the potash they contain is valuable and the lime and charcoal help to keep the soil sweet.

In addition to being well enriched, the soil should contain plenty of humus and, if necessary, should have enough sand added to be friable. Soil enriched as suggested will usually carry the plants through until time to set them out, but if at any time they seem to be holding back without apparent reason a watering with liquid manure or with liquid nitrate of soda, either of which can be applied with a watering can, will result in a quick and marked improvement if the trouble was lack of available nitrogen.

When to Water

WATER. Unfortunately circumstances are likely to tempt the gardener to give too much water at first, and too little later on when the actual needs of the plant are precisely the opposite. When the gardener's early spring enthusiasm must be confined to the few pots and flats of plants in his greenhouse or hot-bed it is a very easy matter for him to be overzealous with the watering can, though the plants really need little moisture; later, when rapid growth, rapid evaporation and a high temperature cause them to require almost as much water as they can get, the gardener is busy outdoors with other things and is likely to forget the regular time for watering his seedlings. The result is that when he does happen to notice them they are

badly wilted and the soil has become dust dry or baked into a hard cake.

Every effort should be made to keep the soil in either flats or pots in as even a state of moisture as possible. Extremes injure the plants' growth, and after the soil dries and parts from the edge of the box or pot it is exceedingly difficult to get it moist clear through again. If your plants do get dried in this way let them get a thorough saturation by soaking up water from below in a pan or tub. Or apply a little water at a time at intervals of half an hour or so until the soil is again in good condition.

Early in the season, when the soil does not dry out so quickly and there is more danger of overwatering than of underwatering, water the plants early in the morning on bright days so the foliage can be dried off before night. Later, when it is difficult to keep the soil wet enough, water late in the afternoon.

It is important, whenever it is possible, that the *air* as well as the soil be kept reasonably moist. In the greenhouse this can be accomplished by an occasional sprinkling of walks and benches. In the hot-bed or cold-frame, where outside air has freer access, there is not likely to be trouble from overdry air.

As to how often to water there can be no special rule of thumb; it will depend upon the condition of the soil, which will begin to get light colored and dry on top as the moisture content gets too low. When this is the case give a thorough watering that will soak the soil clear through to the bottom. If you are not sure just how much to give go over the pots or flats some fifteen minutes after the watering and examine the soil carefully to make sure that it is wet clear through. Plants set in beds or in cold frames will not need watering so often as those in flats and pots.

Fresh Air Essential for Healthy Plants

AIR. Plenty of fresh air must be given at all times if the plants are to be kept healthy. Especially is this necessary

as the plants begin to reach the size for setting out. In the greenhouse or hot-bed fresh air should be given every day. As soon as the weather is warm enough the hot-bed sash should be stripped off entirely during the warm days. Plants in the greenhouse should be transferred to the cold-frame or to some sheltered spot where they can be protected from late frosts some time before they are wanted to be set out of doors. As much fresh air as possible should be given, without too greatly lowering the temperature. Direct drafts on the plants, or too sudden variations of temperature, should be avoided.

LIGHT. Even an abundance of fresh air will not keep seedlings from "drawing up" into spindling, worthless plants when they are kept in dark or shady corners. Full light should be given. Any seedlings that seem inclined to grow too tall should be kept as near the glass as possible. To make even growth the potted plants should occasionally be shifted round to prevent their becoming one sided, and those that are on the back or center of the bench should be put toward the front. Potted plants for bedding, which are usually kept in the pots for a longer period than the vegetable plants, should be handled over this way occasionally, and the surface of the soil lightly broken up.

TEMPERATURE. The temperature, whatever it should be for the plants to be grown, should be kept as constant as possible. It is an easy matter to get the house or the frames too hot when long, bright days come. Sashes can be removed, but in the greenhouse it is often impossible late in the spring to keep the temperature down, even with all the ventilators open. Shading the glass may be necessary. A weak whitewash or even a very thin clay mud may be used for temporary purposes.

PROTECTION. The old adage about an ounce of prevention applies here with double force. All the conditions, such as extremes of watering or temperature, overcrowding, shady corners, and so forth, which are unfavorable to growth, invite trouble from insects and disease. Fresh air, abundance of room and sunshine discourage these troubles.



PLATE 3.—The simplest effects are sometimes the most pleasing. The picture above gives a hint of what can be done in a short time and with inexpensive plants. How much more attractive is an inexpensive arrangement like this than a round bed with plants of different colors set in circles in the middle of the front lawn!



PLATE 4.—Plants in pots should be re-potted often enough to keep them growing vigorously. In the photograph above, the plant on the left has become "pot bound" by being left too long. The one next to it is about ready for a "shift" to a larger pot. The two on the right do not yet need to be changed. To examine the roots, invert the pot and rap the edge against a box or bench.

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If you have been bothered before by green plant lice, use tobacco dust freely round the foliage and the soil before they appear. If they get a start spray thoroughly with a nicotine solution, or fumigate if you can make the place tight. If you haven't a compressed-air tank sprayer buy a substantial brass hand spray, which can also be used for many side jobs in the small garden.

Transplanting and Hardening Off

In transplanting get everything ready before you begin work. Have the soil in the flats moist but not wet enough to be sticky, and that in the flat from which the plants are being taken slightly dry, so the roots may easily be disentangled without being left bare. Take the small plants out in chunks and separate them carefully. Place them in pots or flats deep enough so that they will stand up sturdily. Plants with long stems, such as beets, cabbages and cauliflower, can be cut down nearly to the first leaf. Tomatoes, peppers, eggplants, and all flowers that are started early should be given a second transplanting, preferably into pots. Paper pots are much cheaper and are easily kept watered. If clay pots are used they should be sunk into soil or ashes or moss to prevent their drying out too quickly.

Potted plants for the flower garden may need two or three shifts before they are as large as wanted. The time for changing them will be indicated by the roots' forming a network upon the outside of the ball of earth. A shift should be given while these roots are still white and active. If left too long and allowed to become tough and woody the plant will be severely checked if not permanently injured. In transplanting and repotting, water thoroughly after the operation and then keep the plants shaded from the hot sun for a few days. Water sparingly—only to moisten the foliage.

All hardy plants, such as beets, cabbage, cauliflower, lettuce and kohlrabi, and the early flowers, such as pansies, daisies, pyrethrum and so forth, should be hardened off

thoroughly before being placed in permanent positions. If they are growing in a frame leave the sash off night and day; if they are in a greenhouse shift them to the outside. Careful watch should be kept, especially just after they are put out, to see that a sudden change in temperature does not catch them some night. Any of these things, when they are properly hardened, can stand a few degrees of frost without being injured. It is a good plan to have a number of cloth frames on hand for use over these things during the two weeks or so before they are to be set out, as these will give ample protection, and the glass sash can be used over the more tender things or to forward crops growing in the frames. If in spite of your watchfulness the plants should get frozen some night keep them shaded from the sun the next morning, and thaw them out with very cold water.

A number of the flowering plants that are grown from seed, such as heliotrope, salvia, antirrhinum, and the like, tend to grow up to single tall stalks, though rugged branching plants are desired. As soon as the plants begin to make strong growth after transplanting, the tops should be pinched out to induce the growth of the side shoots. The tops, if large and firm enough, may be used for cuttings to make a second batch of plants.

March: Third Week

THE FIRST PLANTING AND SEEDING IN THE OPEN GARDEN

As soon as the pussy willows push open their little gray buds the gardener begins to wonder when he would better begin planting. Naturally he is anxious to have his first mess of peas just a few days ahead of his next-door neighbor; but, on the other hand, he does not want to lose his plants or have his peas rot in the ground. A few things that can be planted "as soon as the ground is fit to work" include sweet peas, smooth garden peas, radishes, onions and spinach. Other early things should not be put into the ground too hurriedly. Often a warm period, which will dry out the soil so it can be spaded and put into fairly good condition, will be succeeded by a few days or a week of real winter weather, and the early plants and such seeds as beets and carrots may be damaged considerably.

In the latitude of New York and Chicago the first planting may be done from the last week in March to the middle of April, according to season and soil. Plants that may be set out as soon as hard freezing at night lets up are cabbage, lettuce, beets, broccoli and kohlrabi. The rest of the early vegetables for sowing in the open are beets, cabbage, lettuce, carrots, kohlrabi, onions, parsley, parsnips, salsify, turnips, and water cress; and cauliflower, celery and leeks, to be transplanted later. Cauliflower plants, wrinkled peas and potatoes should be held back until the weather has moderated still further.

A simple rule, which varies automatically with the season and is therefore better than a calendar date, is to plant the hardy things while the plum and peach trees are in

bloom, during which time the temperature will average about forty-five degrees in the shade.

Make a Fine Seed Bed

Thorough preparation of the seed bed is the most important step in seed sowing. The soil should be dug and raked to get it into general good condition. Be careful to get all manure well turned under, and *mixed with the soil*. If left in a solid layer beneath the surface, in a dry season it may do more harm than good, by cutting off the water supply from below. Just before you plant go over the ground thoroughly again, so it will be moist clear to the top, and the surface should be made as fine and as level as you can make it.

A number of the garden seeds, such as onions, carrots, and turnips, are very small and must not be planted deep.



Wrong way



Correct way

If the soil is rough and lumpy it will dry out very quickly on top, even at this time of year, when a few inches below the surface it is abundantly moist.

It is no less important to prepare the soil thoroughly where plants are to be set out. It must be fine and mellow to pack closely round the hundreds of little rootlets, and to form a dust mulch on the surface as soon as the planting is done.

In the small garden there is no excuse for the rows not being straight as a string. Mark off the first one with your garden line. If the soil is in the right condition you can "snap" a mark into it; have the line tight, raise it at two or three points along the row and let it snap back against the soil. Otherwise mark the row with your rake handle. Then watch your wheel, if you use the seed drill, and keep



PLATE 5.—Among the time saving, labor saving attachments available for the wheel hoe is the double plow used for opening furrows in planting potatoes, peas or beans, or for covering under manure or fertilizer before setting out plants. (Lower) In setting plants, have the ground prepared in advance, keep the plants exposed to wind and sun as short a time as possible, and *firm the earth well about the roots.*



PLATE 6.—In small gardens and flower beds, where seeds *must* be planted by hand, a straight edged wide board is a great convenience. (*Lower*) In sowing very fine seed, such as that of many flowers, use a brick or piece of smooth board to press the surface down smooth. This will tend to keep it moist and insure good germination.

it straight on this row so that the succeeding rows will be exactly parallel.

Don't just empty a packet of seed into the drill. If you have a garden plan you will know just exactly what you have to do. Anyway figure out just how much of each thing you want to plant, and plant no more or no less. If a little seed of some things is left over—not enough to save—throw it away.

In planting very early in the spring you should keep in mind existing conditions, which are quite different from those that will obtain later. At this time of the year the ground is likely to be too wet rather than too dry. Therefore seeds should be planted comparatively shallow, not so deeply covered as you would cover the same kind of seed six or eight weeks hence. For the same reason it will not be so necessary to roll the soil hard above the seeds, though they should never be covered loosely. Seeds should be planted thickly, as conditions are not wholly favorable.

Planting by Hand

When seeds have to be put in by hand use a long flat board twelve or fifteen inches wide. Mark out the drill along one edge of this, then kneel on the board and scatter the seeds thinly and evenly. Cover them lightly and press down the whole row evenly with the edge of the board.

Fertilizer or manure for vegetables sown from seed is almost always broadcast on the surface before planting. Part of that used for plants to be set out, however, should be applied in the hill. The quickest way of doing this, when any number of plants is to go out, is to open a row with the hoe attachment on the wheel hoe, mark across the row, drop the fertilizer or manure at the intersections of the lines and then cover the row again—the marks left between the rows showing where the plants are to be set. When only a few dozen plants are to be set, however, it will probably be quicker simply to mark out the rows, dig small holes with the hoe at each place, drop in the manure or

fertilizer, mix it with the soil and fill the hole level again ready for the plant. Do your transplanting on a cloudy day, or late in the afternoon.

In the following planting table necessary information is given for planting the various early crops.

EARLY HARDY CROPS

VEGETABLES	SEEDS OR PLANTS FOR 50 FEET OF ROW	DEPTH IN INCHES	APART IN ROWS, INCHES	DISTANCE APART OF ROWS, INCHES
Asparagus.....	50	4	12	36
Beets.....	100-150	1	4-6	12-15
Broccoli.....	35	$\frac{3}{8}$	18	24
Cabbage.....	35	$\frac{3}{8}$	18	24
Carrots.....	$\frac{1}{2}$ oz.	$\frac{3}{8}$	3-4	12
Cauliflower.....	35	$\frac{3}{8}$	18	24
Celery.....	$\frac{1}{2}$ oz.	$\frac{1}{4}$ - $\frac{1}{2}$	2-3	12
Endive.....	$\frac{1}{2}$ oz.	$\frac{3}{8}$	12	12
Kohl-rabi.....	$\frac{1}{4}$ oz.	$\frac{3}{8}$	6-8	18
Leek.....	$\frac{1}{2}$ oz.	$\frac{3}{8}$	3-4	15
Lettuce plants.....	50		8-12	12-15
Lettuce seed.....	$\frac{1}{4}$ oz.	$\frac{3}{8}$	12	12-15
Onions.....	$\frac{1}{2}$ oz.	$\frac{3}{8}$	2-3	12-15
Onion seedlings.....	150		4	12-15
Parsley.....	$\frac{1}{2}$ oz.	$\frac{1}{4}$ - $\frac{1}{2}$	4-6	12
Parsnips.....	$\frac{1}{4}$ oz.	$\frac{1}{2}$ -1	3-5	15-18
Peas, smooth, for early planting..	1 pt.	1-2	2-4	36
Peas, wrinkled.....	1 pt.	2-4	24-48	36-48
Potatoes.....	$\frac{1}{2}$ pk.	3-4	13	28
Radishes.....	$\frac{1}{2}$ oz.	$\frac{3}{8}$	2-3	12
Salsify.....	$\frac{1}{4}$ oz.	$\frac{3}{8}$	2-4	15-18
Swiss chard.....	$\frac{1}{4}$ oz.	$\frac{3}{8}$	8-12	15-18
Turnips.....	$\frac{1}{2}$ oz.	$\frac{1}{4}$ - $\frac{1}{2}$	4-6	15

BEETS. Plants should be set out in rows a foot apart, with about four plants to the foot. The seed should be sown in the driest soil available, from half an inch to one inch deep.

CABBAGE. Well-hardened plants will withstand cold. Most of the first planting should be of a late variety. A packet or two of seed should be sown to furnish plants for summer and early fall. Make the rows six to ten inches apart.

CARROTS. Sow the seed thickly; cover very lightly with very fine soil.

CAULIFLOWER. Usually this should not be put out until a week or two after the cabbage. Broccoli is hardier.

LETTUCE. The plants should be set about a foot apart each way, though the smallest varieties, such as Tom Thumb or Mignonette, may be set closer. A little semiliquid hen manure put under each plant will help in producing rapid and large growth. Seed of one of the summer varieties and of one of the early varieties should be sown when the plants are set or shortly after. The plants should be thinned out as soon as they are large enough.

ONIONS. A few sets should be put out to furnish an extra-early supply. If large bulbs are wanted the sets should be small and hard. If green or bunched onions to eat raw are wanted size will not make much difference. The bed for the seeds should be particularly well prepared. It is a good plan to mix a few radish seeds with the onions, as they come up quickly and mark the rows and also serve as traps for the onion fly.

Of the garnishes, "green" onions are among the best. These are usually grown from "sets," or small onions, which were sown the year before, and this is the best way to get the really early ones for the table. The sets known as "white" or Silverskin should be used, as they are small, quick-growing and mild. For succession grow white onions from seed, to be used as a garnish for salads. The flavor of a young onion, grown quickly from seed in porous mellow soil, where there has been no check from lack of moisture, is extremely delicate and far surpasses that of those grown from sets. There should be several sowings so you can continue to use them when the bulbs are the size of chest-nuts.

To grow onions the soil should be the richest possible; it will be well to dig in the manure from the chicken house and the ashes from the wood fire. A commercial fertilizer analyzing 4-7-10—four per cent nitrogen, seven per cent

phosphoric acid and ten per cent potash—should be broadcast before raking and the surface of the beds made very fine and even. Sow the seed thinly in drills a foot apart to fifteen inches for wheel-hoe culture, and not deeper than half an inch. Sowing should be done when the soil is moist enough to work well.

PARSLEY. The seed germinates very slowly and should be soaked a day or two in lukewarm water before planting.

PARSNIPS and SALSIFY. Both of these good winter vegetables have peculiar-shaped seeds. The ground where they are to be planted should be spaded deeply, as they require a generous depth of soil in order to make shapely roots. Thin out as soon as they are well started.

PEAS. These may be sown in single or twin rows about six inches apart, making the rows three to four feet apart for the dwarf varieties and a little more for the tall ones if brush is to be used. Make the first plantings quite shallow, and sow extra thick. If they come up too thickly some of the plants should be cut out with a small hoe, or pulled out.

RADISHES. Sow only a few feet of row at a time, as they mature very quickly and soon get stringy and pithy. A good method is to sow a short row in the seed border each week. A generous dressing of land plaster along the row before sowing will make them bright and crisp.

TURNIPS. These mature quickly, and only a few of the earlier sorts should be sown. Weed the rows and thin out as soon as possible after they are up.

March: Fourth Week

FIRST PLANTING OF FLOWERS OUT-DOORS; PRUNING ROSES; WORK WITH THE HARDY BORDER; GETTING A START WITH ANNUALS

Spring work in the flower garden, like that in the vegetable garden, cannot be done all at one time. But the earlier start you can get, and the more you can keep ahead of the several jobs to be done, the better. To do their best, flowers require a large amount of moisture in the soil, and the best way to provide this is to work the beds up as soon as rainy weather lets up.

For the purposes of planting, it is important to know whether flowers are hardy, half hardy or tender. This information is almost always given on the packets in which the seeds come. It is a good plan to plant flowers of the various groups soon after you plant vegetables of the corresponding groups. Sweet peas, however, should be planted as early as possible.

Along with other information on your packets of flower seeds you will note the direction "or start early under glass." You may have started some already if you have a hot-bed; if not it is by no means too late to start them in the cold-frame or the hot-bed now—but you must do it at once. The half-hardy and tender plants cannot safely be planted in the open for four to seven weeks to come. If seeds of these are to be sown in flats and the seedlings transplanted *before* setting out in the garden, they may be put in quite thickly. If there is not time or room for this sow the seeds rather thinly in rows four to six inches apart in the frame and thin the plants to stand two or three inches apart. In this way a good supply of stocky little plants, which will advance your flower garden several weeks, can be grown with very little trouble.

A Substitute for a Cold-frame

If not even a cold-frame is available a specially prepared seed bed may be made in some sheltered place, south of a wall or building, and protected from any drip from the eaves above. Spade up a narrow border four or five feet wide, raising it a little above the general level of the garden. Unless it is naturally good soil and can be made fine and mellow, put on top some four inches of clean, rich soil from one of the old flower beds. Make the bed perfectly smooth and mark out shallow drills six to ten inches apart. Cover the flower seeds lightly and then roll, or gently pack down the whole surface with the back of the spade. This bed should be conveniently situated, so it can be watered either with the hose or with a watering can. In preparing the bed, rake in a good dressing of bone flour. The plants should be thinned out as soon as they are large enough so they will not crowd. With very little extra work you can have from a border four by six feet a good many hundred plants of many different kinds ready to set out in the beds only a little later than you would ordinarily sow the seed.

Plants that do not lend themselves to transplanting, such as poppies, and some of the quick-growing annuals, like portulacas, are almost always sown where they are to flower. The surface of the soil should be made as fine as possible, no matter how many times it has to be gone over. The seed is thinly broadcast or dropped in rows on the surface, if very small, and pressed into the soil with the edge of a board or with a brick.

In preparing the flower beds work in all the manure and humus you can and in addition give a top-dressing of bone dust or mixed fertilizers. If the beds are spaded up some weeks before you expect to plant them rake them over occasionally to destroy sprouting weeds and to maintain a dust mulch.

If tree roots invade the flower bed cut down about the edge of the bed with an edger or with a sharp spade, going

as deep as you can. If there is much trouble from this source it will pay to repeat the operation several times during the summer, keeping the roots cut off while they are small.

In buying plants for your flower garden, keep in mind that good health and a growing condition are to be preferred to size. Also resist the temptation to get one of each thing rather than sticking to a few good sorts and colors. A bed of geraniums of one solid color is very much more artistic and effective than one in which shades of pink, red and white are indiscriminately mixed.

First Work in the Rose Garden

The most important part of the year's work in the rose garden must be attended to soon. When severe freezing weather begins to let up and the frost is pretty well out of the ground take the mulching off the rose bed and from around the single plants. It is best not to do this all at once, however, but to take off a little at a time, leaving only so much about the plants as can be readily worked under when the soil between the plants is forked up. A dressing of fine bone or bone flour and coarse bone mixed should be worked deeply into the soil at this time. If the soil has been hilled up round the stalks in the fall for winter protection it should be leveled at this time.

Spring Pruning of Roses

As soon as the dormant buds or eyes start along the old canes, or swell into leaf buds so large that you can tell where there is deadwood, begin pruning. The hardy perpetual sorts should be pruned first. Garden roses flower on new wood, so in cutting back you are not destroying any possible roses. The average gardener is much more likely to prune too little than too much. Stronger varieties are pruned less severely than those of a weaker habit of growth. If the plants are lightly pruned they will bear many flowers of small size. If moderately pruned they will bear fewer and

larger flowers; while for the largest and finest individual blossoms the plants should be very severely pruned.

Beginning with the hybrid perpetuals, which are the hardiest and most robust in growth among the garden roses, cut out clear to the ground all but four to eight canes, and cut these back from a third to a half. For large flowers, cut these remaining canes back to four to eight eyes or buds from the ground. The hybrid teas, many of which are comparatively weak growing, will need more severe pruning, but they can be cut back until the garden looks like a collection of stubs without in any way injuring the quality, and not greatly lessening the quantity, of their flowers. Leave canes placed as evenly as possible and as spreading as possible so that the bush will have an open center. Always cut about a quarter of an inch above an outside eye, so the new branch will grow outward.

Occasionally a rose bush will throw up a very strong-growing cane looking quite different from the others and bearing very few or no buds. Such a growth should be cut out. If each leaflet has seven parts instead of five you may know that the cane springs from below the collar or graft of a budded rose, and unless it is destroyed it will be likely to kill all the upper part of the plant.

The rambler roses are of an entirely different type and should not be pruned early in spring further than to cut out any very old, diseased or broken wood, or to cut the plant into more shapely form. In this case all the live wood that is cut away does sacrifice flowers. The rugosas or Japanese roses, which are very hardy, require little pruning except to cut the old canes clear to the ground when they become too thick. The same is true of roses belonging to the Bourbon, China and polyantha classes—the latter including most of the dwarf and baby roses.

Roses may be bought as dormant roots or as potted plants in active growth. The dormant roots should be planted as early as it is possible to work the soil. Growing plants should not be set out until after danger from frost. The bed should be dug out to a depth of two or three feet, and

the subsoil broken up with a pick; then a layer of drainage material, such as coal or cinder, several inches thick should be put in and covered with sod; and on top of this a layer of good garden soil, well enriched with manure or bone dust, should be placed, extending within six inches or so of the surface. It is well not to enrich the top layer of soil, so the roots will be induced to grow downward rather than to feed near the surface. (See directions on page 300.)

The plants should be set in a little deeper than they have been growing, as shown by the soil mark on the stem. The union or collar should be two or three inches below the surface. Great care should be taken to keep the roots moist, well covered with moss or burlap, while planting. Do not leave them lying round exposed to wind or sun, even for a few moments. After planting, prune the plant back even more severely than you would a well-established rose of the same kind.

Work with the Hardy Border

Do not be in too great a rush to get the mulch off the hardy border. It should be left on until all danger of a premature start, owing to a false promise of spring weather, is past. Do not, on the other hand, leave the mulching on until the plants start beneath it and then expose the tender new growth to a late frost. It is best to remove the cover gradually. If manure was used, work as much of it as possible into the soil as soon as it is dry enough to fork. At the same time add bone dust or mixed fertilizer. Borders or beds for perennials should be prepared as soon as possible, and if the plants do not come from too far south of their permanent location they will bloom this summer. Potted stock is usually a little more expensive than field-grown stuff, but it will give much better results.

Almost every spring the gardener will want to move about some of his own old plants. This is desirable if he wishes to increase his stock or has varieties that have become crowded after a number of years. Some things can be increased by

division of the old clumps, such as iris, hardy phlox and lily of the valley.

All surface soil in the borders should be forked over as deeply as possible without injuring the plants, and then should be raked or hoed fine and loose. In sections where there is likely to be a long summer drought it is well to keep the winter mulch handy to apply again as a summer mulch.

Getting a Start with the Annuals

Popular judgment is not far wrong when it comes to picking out the best of the annuals. But, paradoxically enough, some of the best-known annuals are the least known. Take nasturtiums, for instance. Nine persons out of ten still buy seed in collections. Why not buy a few of the splendid new named sorts? The seed costs more. But nasturtiums are almost always planted too thick to do well. The dwarf sorts make good borders. They flower profusely even in poor soil.

Sweet peas used to be bought almost altogether by the "collection" also, but dozens of named varieties are now well known. A little extra attention given to the planting and care of your sweet peas will be amply repaid. For best results trench the rows, forking in at the bottom a good layer of rotted manure. The rows, if in a well-drained position, may be made about six inches deep at first. Cover the seed about two inches, and gradually fill the trench as the plants grow. Leave a slight depression to help in watering. Provide a suitable trellis before the vines begin to climb. Mulch with leaf mold, grass, or light manure as dry weather comes on; the mulch is desirable even when water can be given, as it prevents alternate drying and soaking of the soil and keeps it cool.

Poppies cover a wide range of form and color, and may now be had in numerous named varieties. The seed of the annual sorts is very fine, and care should be exercised to make the seed bed as fine as possible. Unless the soil is moist, water it thoroughly several hours before planting.

Scatter the seed as evenly as possible and then firm the whole surface with a small board or with the back of a spade. Thin out, on a cloudy day, if the plants are too thick.

For brilliant and lasting mass effects, with a minimum of expense and trouble, no flowers exceed the plebeian petunia. For most bedding purposes the single-flowered sorts, in separate colors, are preferable. The seed is quite small and germinates freely, but the plants are usually left too close together to produce the best results. Thin to stand eight to twelve inches apart. In thinning the double sorts, remove the strongest plants, as they are more likely to bear single or worthless flowers.

For low-growing, spreading plants to give brilliant masses of color up to hard frosts, glorifying the autumn garden, sow a few beds or parts of beds to verbenas. They may be thinned to ten to twelve inches at first, and then every other plant removed and set out where earlier flowers have gone by or failed. There is a new crested type quite distinct from the older sorts.

April: First Week

POINTERS ON PLANTING; PROTECTION FROM LATE FROSTS; LABELS AND MARKERS; CARE OF TOOLS

There are usually one right way and several wrong ways of doing the simplest garden operation. Take, for instance, the use of the spade and the rake.

In using the spade the hard part is generally not so much in lifting and turning the soil as in breaking it away before it is lifted. Handle the spade so that only one edge of the piece being dug will have to be broken away—making the cut slightly diagonal. A beginner at raking almost always makes the mistake of attempting to use the implement as he would to rake grass. But the purpose here is to fine and level the soil, necessitating a backward-and-forward movement over a small piece of ground.

Some Pointers on Planting

Practically all seed sowing is now done by machinery, but occasionally it is necessary to employ the old art of hand sowing, especially for flower seeds in the small garden. The best way to handle very small seeds is to mix them with fine, dry sand or dirt, which makes it possible to get a much more even distribution in the drill. Small seeds of which only a few are wanted may usually be sown from the packet. Hand planting is best done with a board twelve to fifteen inches wide, which can be used to mark out the row, to kneel on when sowing the seed, turned on edge to press the seed into the furrow for covering, and turned over to mark out the next row. This insures straight rows and at the same time avoids tramping down the soil.

It is frequently desirable to hurry a crop along, or, when conditions are not favorable for sprouting, to give the seeds some treatment before planting. The method generally used is to soak the seeds from twenty-four to forty-eight hours in tepid water so they will be at the point of germination before they are put into the soil. This is specially desirable for seeds that germinate slowly, such as celery, parsley, and the like. But it can be used to advantage in other cases—to get a quick start with peas, for instance. Hard-shelled seeds, such as cannas and moonflowers, may be filed or notched with a sharp knife, and then soaked. Do not allow soaked seeds to become dried out again before planting. They may be rolled in dry dust or in gypsum to prevent their sticking together in planting.

It often happens that plants received by mail or express in the course of the spring have to be kept for several days before they can be set out, although they should always be put into the ground as soon as possible. When the plants arrive unpack them carefully and look them over to see that you have just the right numbers of the right varieties. Untie the packages so the plants can get plenty of air, but keep them where they will be protected from wind and sun and will be kept cool. The roots should be kept moist either by heeling them in moist earth or by having moist moss or burlap wrapped round them.

Protection from Late Frosts

Sometimes plants are large enough to set out before conditions are just right for them. The first thing to do with plants that have grown as large as you want them to be is to get them into the open air. Keep them where they can be protected from frost, but where they can get full sun and air. Give just enough water to keep the soil from drying out. Water thoroughly, however, the day before planting, so that the soil and roots will be in the right condition.

Occasionally during March, April and early May in the Northern States the gardener who is trying to be early will

have a close call from frost. When there are indications of a dew fall and the thermometer drops rapidly late in the day, and the air is still, and the sky is clear, the gardener's safe course is to cover the plants. Those in the cold-frames, if covered even with cloth sash, will be protected from several degrees of frost. Blankets and old bags and burlaps supported above the plants on a few short sticks will answer the same purpose.

For plants that have already been set out other means will be necessary. One of the most effective methods of covering such early things as potatoes and peas is to run the wheel hoe with the hilling attachment along the row and hill up the earth over the plants.

Also you will find it well to save a supply of newspapers, with which in a few minutes you can cover up a hundred or two hundred plants or hills of such things as pole beans, tomatoes, melons or squash; put several thicknesses of newspaper over each and hold the edges down with a few trowelfuls of dirt. Inverted tomato cans or flower pots may be used to protect individual plants.

If, in spite of all your precautions, some of your plants get nipped they should be protected from the sun the next morning and watered as early as possible with very cold water. This may form a very thin coating of ice on the leaves, but it will serve to get the frost out gradually, which lessens the damage.

Instead of temporary frost protection of this kind, however, much better and earlier results are to be had by permanent plant protectors, of which there are numerous kinds to be bought or made. One of the simplest is the plain forcing hill, which is nothing but a pane of glass on top of a bank of soil about the hill or plant. In many soils, however, this cannot be successfully accomplished; and it is always somewhat of a makeshift method, open to the objection that the hollowed hills collect water when it rains, and are too low for most purposes. One of the various types of individual forcers to be bought can be used to great advantage, particularly when only a few are required. With



PLATE 7.—Plant forcers and plant protectors have their place in every well equipped garden. The glass front type, shown at the left, will enable you to set out tomatoes and other tender plants over two weeks earlier than you could without them. The kind shown at the right is sure protection from late frosts and early insects.



PLATE 8.—When transplanting in hot, dry weather, make sure of having the plants in firm by packing the soil close about the roots by using the balls of the feet, after planting. (*Lower*) To keep plants from wilting, shade from the hot sun with newspapers, held in place with a little soil.

care they will last a great many years, so that the cost is by no means prohibitive. Two inexpensive and practical forcing frames adapted to such tall plants as tomatoes may be sawed from an ordinary cracker box, with glass about thirteen by twenty-two inches fitted in one side. For melons, etc., they may be made flat, as shown in the cut on page 11.

Labels and Markers

One of the little things commonly overlooked in the garden is careful marking of both vegetables and flowers in order that one may keep tabs on varieties, dates, yields, colors, and so forth. How often one sees an empty seed packet on a stick or held down by a stone as the only garden record! It does not take long to learn that such a makeshift tag will be blown away or obliterated by the mud and rain. When a hundred eight-inch garden labels can be bought for thirty-five cents there is no excuse for the gardener who does not know when and where he has put everything that grows in his garden. A more expensive but more convenient form of label is a small card which is held on a covered plate placed at a convenient angle on an upright iron stake; on this a record card can be kept plainly visible but protected from the elements.

If you have not made a planting plan in advance secure a good-sized armful of stakes—pieces of shingle, or kindling strips, or whips of willow or birch—before you begin to sow seeds. Stick them up along one edge, marking off with each the space for one variety of seed.

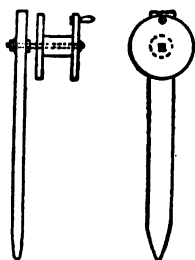


If you haven't a reel and a marking line, by all means get a ball of stout twine and a couple of short sticks. For rows of plants, or for such seeds as are not planted with the seed drill, a one-row marker may be made by nailing or bolting a strip of inch stuff to the wheelbarrow and attaching a short

chain to this to drag. A regular marker may be made easily with a six-foot strip of two-by-two-inch pine and a half dozen twelve-inch spikes. Find the center of the strip and make marks six inches from the center on each side; then make marks every twelve inches each way to the end. Bore six holes slightly smaller than the spikes and drive these into place. Fasten a handle to the strip.

Keep the Tools Bright and Sharp

Probably nothing will so cut down the gardener's work, take it the season through, as bright, sharp tools. After using them wipe them off with a few old pieces of burlap and then go over them with a cloth well soaked with oil. Have



a good flat file, costing fifteen or twenty cents, with which to "touch up" your hoes, wheel-hoe attachments, and so forth, as they become dulled through use. If the heads of any of your tools become loose half a day's soaking in a pail of water will usually tighten them up. If the garden is not handy to the tool shed much time may be saved by getting a substantial dry-goods box of conven-

ient size, fitting it up with a pair of cheap hinges and a couple of shelves, and giving it a coat of paint; it will make a miniature tool house to be kept at the head of the garden.

A simple but practical garden reel may be made as follows: Take a piece of inch or inch-and-a-half hardwood four inches wide and eighteen to twenty-four inches long. Make a tapering point on one end, and in the middle of the other end bore a hole large enough to take a half-inch bolt. Make a simple spool out of two pieces of half-inch stuff, and a core of two-inch stuff, round or square. Through the latter bore a hole in which the half-inch bolt can turn easily as the axis. You will always know where to find your line.

Plant supports, to be used for tomatoes and such plants in the flower garden as may need low supports, may be made

of wooden barrel hoops and laths. Two hoops and three or four laths are used for each support. With shingle nails fasten one hoop near the ends of the laths, and another twelve to eighteen inches from the first hoop. Point the other ends of the laths so they may easily be sunk into the ground as deep as may be required.

A support for tomatoes, pole beans, etc., that is much better than the ordinary plain stake, is shown in the figure on page 11.

of cow manure in the mixture. In addition, mix in a good supply of coarse bone—the grade known commercially as “inch bone” being the best for this purpose. With this mixture the bed should be filled to within six inches of the top. It should be tramped down slightly while filling in, so that it will not lie too loose. The top layer should be good garden loam, preferably run through a medium-meshed sieve, into which a good dressing of high-grade fertilizer or fine bone is mixed. This will make the job of plant setting very easy and will furnish congenial conditions for the little new roots. (See cut on page 300.)

All of this may seem like a good deal of trouble to take for such a simple thing as a hardy border, but it is the only way of making sure of good results. Smaller beds, round beds and places for individual clumps should all be prepared in much the same way. When only a few plants are to be set a hole may be quickly prepared with a post-hole digger.

Flower Beds for Annuals

The making of new flower beds for annuals need not be done so thoroughly, as these may easily be enriched every year when they are dug up. It is a good plan, however, to remove four inches or so of the top soil and to mix the manure, compost or fertilizer with the soil below. This will put the richest part of the plants' feeding ground well below the surface, thus inducing the roots to strike down, keeping them farther away from the effects of dry weather and from possible injury by summer work in the bed.

Neighboring trees are often the cause of poor results with flowers. Many of the ordinary fruit and shade trees send their roots thirty to forty feet in search of food, and when one of them runs across such a rich pocket as is furnished by a highly fertilized flower bed it seems to make itself at home, sending out a mass of fine feeding roots. Small roots may be cut off with the edger, shoving it down eighteen inches or so all round the edge of the bed. The larger ones must be cut back with an ax.

Get away from the idea that the bedding plants must be placed by themselves somewhere on the front lawn. It, as well as the perennial border, may be fitted into the general scheme of decoration. There is a big variety of bedding and annual plants to select from, and one can risk experiments with the annuals that might be inadvisable with perennials.

Starting the Strawberry Bed

The earlier you can get in your new strawberry bed the better. But nothing is to be gained by rushing the job so you do not have time properly to prepare the soil. It can hardly be made too rich, though fresh manure should be avoided. The best place, if such a plot is available, is where other heavily manured vegetables have been grown for a year or two; sod ground is inadvisable, as it is more likely to be infested with white grubs—the larvæ of the common June bug.

The home strawberry bed is not very large, and as the product from it is a very profitable one, at store prices, you can well afford to be generous in your application of manure and fertilizer. Whether you get your plants locally or order them from a distance, make every effort to have the ground ready for them by the time they are received. If by any chance you have to keep them waiting, loosen the bundles—but don't lose the tags—and heel them in a shadow trench in a shady place, moistening the soil first.

Either the hill or the narrow or hedgerow system may be used to advantage in the home garden. The former will produce the finer specimens of fruit, but the runners must be kept cut off without fail, so frequently the hedgerow system will prove more satisfactory.

In hills the plants may be set a foot to eighteen inches apart, in single rows two feet apart; or in narrow beds of three or four rows each. In the row system they are set a foot or eighteen inches apart in rows two to three feet apart. In this system three or four of the first runners from each plant are allowed to root, but are turned along the

row to keep it narrow. Others should be cut off as they appear. Keep cleanly cultivated. If the weeds are allowed to get a start the tangle of vines and weeds will very quickly make a great deal of work to save the crop.

Strawberries up to Frost

The fall-fruited berries have come to stay, at least so far as the home garden is concerned. There is no reason why you should not have good berries right up to frost.

Moreover, you can get a crop this fall from plants set out this spring. Plant and treat in the ordinary way, but keep the blossom stalks pinched off until July. Progressive is on the whole the most satisfactory of this type so far developed. Superb is another good variety, with extra-large fruit.

The New Asparagus Bed

If you have been putting off an asparagus bed from year to year, set out at least a hundred plants this spring. Asparagus is not overparticular about soil, succeeding in any good garden loam, even if quite light and sandy. A good plan for the home garden is to make a bed of three rows, as long as may be needed and six feet wide, putting one row in the middle, and one a foot from each side. Set the plants a foot or eighteen inches apart. Good, strong, selected, one-year-old roots are practically as good as two-year-old roots, but it is not always possible to get them. If the soil is in good condition fair results may be had simply by setting the plants out, but extra preparation will pay well. This should be given in the form of trenching each row to a depth of some eighteen inches, and putting in the bottom a generous layer of manure or compost. Then fill with soil to within about four inches of the top, plant the crowns, spreading the roots carefully, and fill in more soil, leveling up to the surface as growth proceeds.

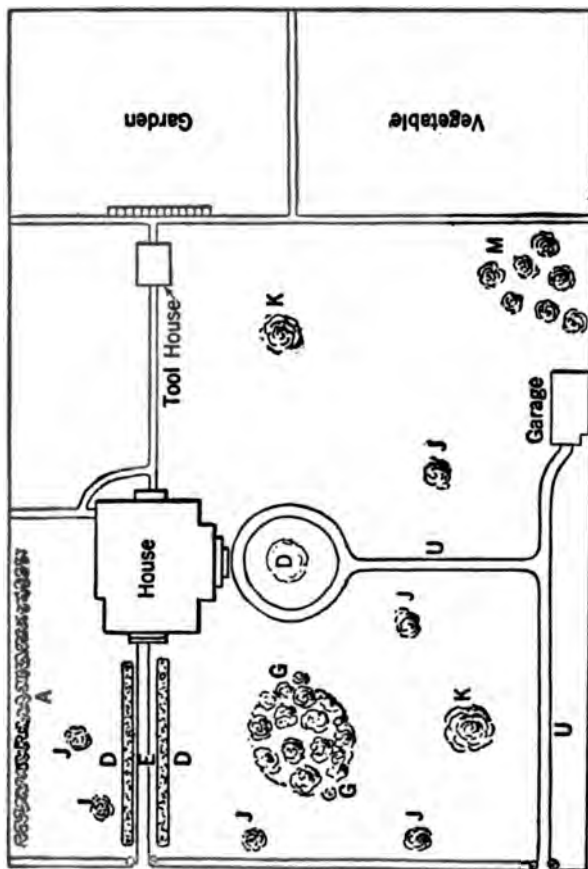
April: Third Week

PUTTING THE HOME GROUNDS INTO SHAPE; MAKING WALKS, ROADS, CURVES, AND GRADES. FIRST WORK WITH THE LAWN; PROPAGATING CANE AND BUSH FRUITS

Work in the vegetable garden and with small fruits will occupy most of this month, but a number of other important jobs can be fitted in between times. These include various little tasks of the spring outdoor housecleaning, such as fixing up the lawn, putting the roads and paths into shape, trimming up the hedges, and so on, according to the particular requirements of the individual place. Not infrequently there are lawns or hedges or paths or some other features to be remade.

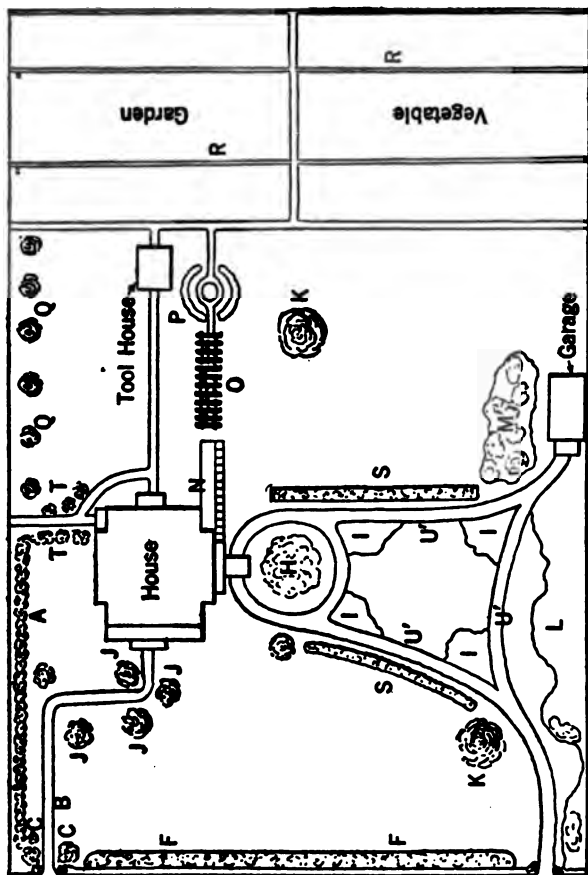
Often the appearance of the grounds can be improved a hundred per cent by moving a few shrubs or trees, changing the position of a path or drive, or adding a hedge, any one of which may be done with comparatively little work and expense.

Sometimes trimming and cleaning and pruning will make a place that has appeared quite neglected look as well as could be desired. But instead of going at the thing piecemeal, as is usually done, a better plan is to start at one side or in one corner of the grounds and do everything clean as you proceed. Don't overlook the little things. Spading up the soil around an individual shrub in a neat circle, for instance, takes only a few minutes, but adds greatly to the well-kept appearance of a place. When things are not exactly as you would have them, the new work should receive first attention, because the sooner it is done the greater is the chance of success.



A—Hedge. D—Flower Border and Garden. E—Walk. G—Shrubs (Move to L).
 J—Shrub or Low Tree. K—Shade Tree. M—Tall Shrubs (Move to M'). U—Drive (Change to U').

How a place may be improved by slight changes in planting and drives. Compare with plan of same place on opposite page. The work may be done a little at a time, but have a definite plan before you begin.



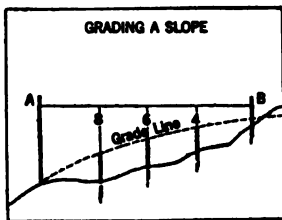
- A—Hedge.
 B—New Walk.
 C—Hydrangeas or Smoke Tree.
 F—New Flower Border.
 I—Shrub or Low Tree.
 J—Low Shrubs.
 K—Shade Tree.
 L—Hydrangeas or Smoke Tree.
 M—Tall Shrubs.
 N—Greenhouse and New Frame.
 O—Pergola to
 Q—Apple Tree.
 R—Overhead Irrigation.
 S—Sundial or bird fountain and rose garden.
 T—Hedge Shrubs.

How to Make Curves and Grades

One of the first problems for the beginner in landscaping is how to lay out any proposed change that he wants to make. It is quite likely to involve the construction of a curve, a rectangle or a grade. A poorly constructed curve will spoil the looks of any job. But you can easily get it true and of pleasing form by the following simple method: Get a piece of heavy twine—or better, a long rope—and a supply of short, pointed stakes, preferably of even size and length. Mark the ends of the proposed curve and two or three points between, and put in stakes. Go along the line again, putting stakes where you judge the curve should come, and then true the line until the position seems about right. Set your rope round the outside of the curve and this will bring out more clearly any imperfections. The rest of the job will depend upon the person using the edger.

How to Make a True Grade

To make a true square corner of a flower bed, croquet ground or tennis court, you must use a little simple arithmetic. Mark out two lines forming the corner, getting one as nearly perpendicular to the other as you can by guess-work. Now measure off accurately from the exact corner six feet on one line and eight on the other; if the length of the straight line between them is ten feet the angle is accurate; if not, move one line until the points are exactly ten feet apart.



To make a true grade you will first have to determine the form you want by making a sketch on paper. Draw a straight line between the highest and the lowest points, divide it into a number of equal spaces and measure the distance, to scale, between this straight line and the curve

of the grade. Then, on the job, drive stakes, stretch a stout cord to correspond to the straight line of your sketch, and drive other stakes until the top of each stake is the correct distance below this line. With a few accurate points to go by, most of the work on any ordinary small job can be left to the eye.

Good Walks and Roads

Good walks are an important feature of any place, both for looks and for comfort. For good service and long wear on more or less formal grounds a cement walk is perhaps the most satisfactory. Under ordinary conditions, however, it is not so attractive as other walks not nearly so expensive to construct, and which, if reasonably well done, will be good enough for ordinary conditions. Of these the gravel walk is about the most pleasing in both looks and service. To last satisfactorily a gravel walk should have a foundation of hard dirt, or, in light soils or wet ground, of coarse rubble underneath the gravel.

If a path is to be built across a lawn or through a garden which is largely turf and has to be mowed, some form of sunken walk is preferable—flat flagstones, bricks, or cement blocks may be used to form the steps. The cement blocks should be two to three inches thick and twelve to eighteen inches square and may be made either of plain cement or inlaid with brick or stone in some simple pattern. When sand is available the cost of these blocks is very little, as the simplest kind of form may be used, and after the cement has set enough to retain its shape the form may be used again. The blocks, after hardening for forty-eight hours, should be stacked up and allowed to ripen for a while before being used. These stones or blocks are set about flush with the grass, which may grow slightly over the edges. They look well, furnish a good footing, and the lawn mower will pass over them.

For short walks bricks, preferably set on edge, may be used with very satisfactory results. Have the surface upon

which you lay them loosened so that they can be pounded down into it with a wooden mallet.

The construction of roads is a more difficult task and one that must be thoroughly done. An ordinary dirt road, unless it is naturally high and dry, should be drained, preferably under ground along one or both curves. Under ordinary conditions common drain tile may be put in and will give satisfactory results. The surfaces of all roads, and walks, too, should be slightly convex so that rain will run off rapidly to one side. Roads or gutters on steep grades or on light soils that are likely to wash badly should be protected by cobbling.

Sodding a Steep Slope

Steep slopes, especially near the house, should be graded and kept in a good firm sod if there is any tendency to wash. Terraces are frequently used, but banks graded to even curves usually look better and are much easier to care for. Steep slopes are often difficult to seed in the ordinary way because every rain or wind may do considerable damage before a sod is formed. In such cases sodding or turfing must be resorted to. Sometimes a combination of sodding and seeding may be used. This is accomplished by laying the sod in strips crossing at right angles, and heavily seeding the intervening spaces. In using this method it is essential to keep the ground from drying out until the sod becomes established. For very steep grades and banks where sod put on in the usual way will not stick, start at the bottom of the bank and lay the sod in tiers, with the edge of each tier two inches or so back of the edge of the tier below it. Beat the surface as smooth as possible with a spade as soon as the sod is in place, and keep well watered until a new surface is formed.

First Work with the Lawn

Early in the spring the lawn should be given a thorough cleaning to remove the winter mulch, if any was used, and

other rubbish that may have accumulated. Then look it over carefully to see how much repairing is needed. If it is in fairly good condition about all the care required will be a thorough raking with an iron rake, loosening the soil as much as possible without tearing up any grass roots; sowing seed in spots that may look thin; applying a top-dressing of bone meal and wood ashes; and giving a thorough rolling with a heavy hand roller, or in a small plot a thorough firming with a hand tamp or the back of a spade.

The lawn that is beginning to wear out will need more attention. If it is very far gone the easiest and best thing to do is to plow or spade it up, working under a good coating of manure. Make the surface smooth and level and as fine as possible, and sow seed. Use bone meal on the surface.

A lawn that is bad only in spots may be put into condition by forking it up where the sod is poorest and adding new soil where it may seem necessary. Use on the surface bone meal or pulverized sheep manure mixed with the seed, as it is essential that the tiny grass plants have some rich food to fix upon as soon as they begin to grow.

Much of your success in making or remaking the lawn will depend upon the quality of grass seed you get. Good seed should weigh twenty pounds or more to the bushel. Buy only from a thoroughly reliable source, as weight alone is not a guarantee that the mixture contains the right grasses in the right proportions for lawn purposes. For shady positions a mixture adapted to such conditions must be obtained, for even good seed of an ordinary lawn mixture will give practically no results in a shady place.

A quart of good seed will cover about 300 square feet. In remaking old sod use only about half as much. Select a quiet day, preferably just before or just after a rain, and sow as evenly as possible. Going over the ground twice, in opposite directions, using half the seed each way, will do much toward insuring even distribution. Carry the seed in a box or a pail, not a bag, so that you can get at it readily, and sow it in small handfuls, being careful to take out just about the same amount each time.

One of the most important points in keeping the lawn looking well is to cut out all weeds and wild grasses. An asparagus knife makes a good implement for this purpose; a regular weed knife or spud may be had at a reasonable price. For the small lawn an old kitchen knife will do. But cut deep, and above all never let weeds or undesirable grasses go to seed. Some of the worst, such as crab grass, are annuals, which can soon be bested if they are never allowed to seed.

The frequent use of a roller is one of the most effective means of getting and keeping a first-class lawn. Mow frequently, but not too close. Have neat, well kept edges; an edger, which may be bought for fifty or seventy-five cents, and a good sharp hoe are the only tools necessary. In trimming edges a mistake very commonly made is to go back too far into the sod, leaving a little bank of dirt several inches high. This dries up very quickly and is easily broken down by every wheel or shoe that touches it. Keep your roads and paths as narrow as possible. They will look better and will be much freer from weeds or grass.

Propagating Cane and Bush Fruits

The cane fruits, such as raspberries and blackberries, often increase themselves both by the rooting of the tips of canes where they touch the ground and by increasing at the roots. Consequently in an old bed enough strong young plants may be found to make a new planting in the spring. Or the tips may be bent down to form new plants, being held in place by pegs or stones and covered with soil. Many other things, such as currants, gooseberries and grapes, may be layered in much the same way. Hardwood cuttings of many of the ornamental shrubs that were made last fall, and have been wintered in the cellar or outdoors under a mulch, should be planted in an upright position in a long, narrow trench or furrow where drainage is perfect. It is a good plan to add some sand to the soil. Put the heel or larger end down. Such cuttings are some-

times buried for the winter with the big end up to induce callusing. Two or three buds or eyes should be left above ground. Stir the soil about the cuttings occasionally, to prevent the formation of a crust. As dry weather comes on they should be watered once in a while. When well rooted they may be transplanted to other rows or into pots, or may be left to make a season's growth before being set in permanent places. Plenty of room should be allowed, as some of the more rapid-growing kinds make a surprising growth during the first season.

April: Fourth Week

KEEPING UP WITH GARDEN SCHEDULE; HARDENING OFF PLANTS; TENDER PLANTS IN PAPER POTS

After all the early crops are in, the gardener sometimes waits longer than he should before putting in the first of the tender crops and succession plantings of such of the early hardy crops as may be required. The tender crops to be grown from seed—beans, corn, cucumbers, melons, squash and pumpkins—should be timed to come up as soon as all danger of late frost has passed. This date cannot be fixed exactly, but it will pay to take a chance on the first planting. If the ground has warmed up enough to insure germination put in a row or two, or a few hills, a week or so before you feel quite sure that the season has settled. Jack Frost may get them, but what of it? The seeds are cheap, and the gardener who will not risk five or ten cents' worth of cucumber seed or sweet corn fails to appreciate the gentle excitement of the gardening game.

Nature's seasonal reminder for the planting of the tender crops is when the apple trees come into bloom, or when the temperature averages fifty-five to sixty degrees in the shade—from the first of May to the first of June, according to latitude and season. The vegetables to be included in the setting out of these groups are beans, corn, cucumbers, eggplants, peppers, muskmelons, okra, squash, tomatoes and watermelons. Also at this season should be made succession plantings and sowings, for transplanting later, of beets, cabbages, cauliflower, carrots, lettuce, peas, radishes and turnips. The second plantings of these things, which are for summer and early fall use, should be com-

paratively small. Crops for the winter supply should be put in as late as possible, but be sure they will have time to get their full growth. Fruits and vegetables that have not quite reached full maturity keep longer and better in storage than those that have made full growth. Data as to depth, distance apart, and so forth, will be found in the table.

VEGETABLES	SEEDS OR PLANTS FOR 50 FEET OF ROW	DEPTH, INCHES	APART IN ROWS, INCHES	ROWS APART, INCHES
Beans, early.....	1 pint	1-2	3-4	18
Beans, wax.....	1 pint	1-2	3-4	15-24
Beans, lima.....	1 pint	1-2	4-6	18-24
Beans, pole.....	$\frac{1}{4}$ pint	1-2	48	48
Beans, pole lima....	$\frac{1}{4}$ pint	1-2	48	48-60
Beets.....	1 ounce	1-2	4-6	12-15
Broccoli.....	35		24-36	24-36
Brussels sprouts....	35		18	24
Cabbage, late.....	25-35		18	24-36
Carrots.....	$\frac{1}{2}$ ounce	$\frac{3}{8}$	2-4	12-15
Cauliflower.....	25		24	24-36
Corn, early.....	$\frac{3}{8}$ pint	$\frac{3}{8}$	36	36-48
Corn, main crop....	$\frac{3}{8}$ pint	2	48	48
Cucumbers.....	$\frac{1}{4}$ ounce	1	48	48
Eggplants.....	25		24	30
Lettuce.....	$\frac{1}{4}$ ounce	$\frac{3}{8}$	8-12	12-15
Muskmelons.....	$\frac{1}{4}$ ounce	$\frac{1}{2}$ -1	48-72	48-72
Peas, late.....	1 pint	3-4	36-48	36-48
Peppers.....	25		24	30
Pumpkins.....	$\frac{1}{4}$ ounce	1	72-96	72-96
Radishes.....	$\frac{1}{4}$ ounce	$\frac{3}{8}$	2-3	12
Squash, summer....	$\frac{1}{4}$ ounce	$\frac{1}{2}$ -1	36-72	48-72
Squash, winter.....	$\frac{1}{4}$ ounce	1	72-96	72-96
Tomatoes.....	15-20		36-48	48-60
Turnips.....	$\frac{1}{4}$ ounce	$\frac{3}{8}$	48-72	15
Watermelons.....	$\frac{1}{4}$ ounce	$\frac{1}{2}$ -1	72-96	72-96

Hardening Off

It is important that extra early plantings of both plants and seeds be made in a sheltered place—the sunny side of a six-foot board fence, or under the wing of a building. Also it is important to have the plants thoroughly hardened off.

Plants taken directly from the greenhouse or hot-bed, where they have been making rapid, watery growth, will succumb to a low temperature much more quickly than those that have been toughened to exposure to the air and low temperatures. This is no less true of the tender things like tomatoes and egg-plants, than of the hardy crops such as cabbage, lettuce and beets, which were set out last month.

It often happens that between the end of April and the middle of May, after a comparatively warm spell, a frosty night comes along. Several expedients that may be fallen back upon in such an emergency, and a few minutes' work, will often suffice to save the early plantings of wrinkled peas, potatoes, beans, corn, tomatoes, peppers and egg-plants. The things in rows, like potatoes and beans, may be covered with dirt for protection. This may be done with a double-wheel hoe, the hilling attachment being set with the points out so that a \wedge -shaped ridge is formed over the row. To protect larger plants, newspapers, either laid across or twisted up into cornucopias and held in place by a few handfuls of earth, will be found very effective. Empty tin cans or flower pots may be used to cover small plants. A quickly constructed shelter for a batch of plants may be made of a few boards or poles rested on boxes or barrels, with heavy bags or blankets thrown over them. Any plants that get nipped should be kept shaded from the sun the following morning and thoroughly doused with cold water. If irrigation is available spray the plants for an hour or so before the sun hits them in the morning.

Planting in Dry Weather

It sometimes happens that dry weather sets in after the early planting has been done and the surface of the soil, at least, is quite dried out by the time it is safe to put in the tender crops. Sometimes it is so dry that every precaution possible must be taken in order to secure a full stand from either seeds or plants. Then the gardener who has prepared his plot thoroughly and has kept it harrowed or raked over whenever a crust formed, will find his trouble

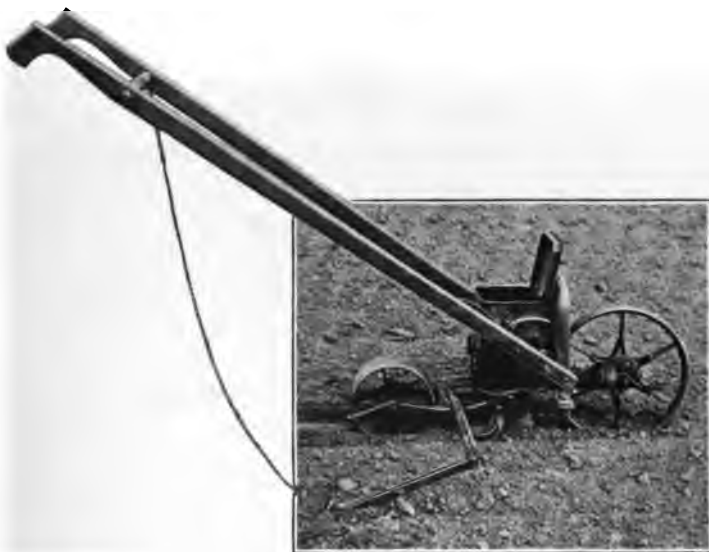


PLATE 9.—No tool in the modern garden is so continually in use as the combination seed drill and wheel hoe,—one of the standard types of which is shown here. With only a few minutes' work, the seeding attachment may be removed and the wheel hoe frame and equipment attached.



PLATE 9.—Melons, cucumbers, squash, lima beans, etc., may easily be started in paper pots or dirt bands, without transplanting, for setting out in the garden as soon as the weather permits.

Tomato plants,—and also pepper and egg plants—are stronger and will begin growth quicker, if “pot grown,” like those in the right hand corner above—the roots are not disturbed when you set them out.

In transplanting, especially in dry weather, the larger leaves should be cut back to prevent wilting. In taking the plants from the flats or frames secure a good ball of earth with each. Plants properly prepared are shown in the lower photo.



PLATE 10.—A good compressed air sprayer is one of the most essential implements for the small place. The type shown here is easy to move about and capable of taking care of everything from the rose garden to the full sized fruit trees and also for spraying the hen house, applying white wash and so forth.

The great secret of success in spraying, is to be ready to do the work *at once*, at the first sign of insects or disease. Keep on hand an assortment containing the things you are likely to need ready for immediate use.

amply repaid: beneath the dry surface the soil will be moist and mellow.

Six weeks ago the best conditions for germination were found near the surface; now they are likely to be found as deep as you can get without covering the seeds so they cannot push through. Plant them deep in the moist soil, and if the weather is dry make the soil firm about the seeds. This may be done by pressing them down into the drill with the ball of the foot, or you may run the wheelbarrow lightly along the row. For very small seeds it is important to have the surface of the ground rolled down hard, so the capillary action will be stimulated instead of retarded, and the moisture will be drawn up from the lower part of the soil to keep the surface moist until the seed has germinated. As soon as possible after germination starts a surface dust mulch should be reestablished.

In summer transplanting every possible precaution must be taken to keep the plants from wilting. As the roots of the plants are some distance below the surface, it is not necessary or even desirable to keep the surface moist; the more thoroughly the dust mulch can be established round the plants the better for them. The soil that comes into direct contact with the roots should be moist; if necessary pour a little water into the bottom of each hole before setting the plants. Plants that are in flats or in pots, or in the soil of the seed bed, should be watered thoroughly some hours before transplanting. The large outside leaves should be cut back a third to a half—this substantially checks the evaporation that causes the plant to go down. The plants should be set into the soil very firmly.

In the home garden it is generally possible to shade the individual plants; this may be done by the same method as already described for keeping off frost. For such things as celery or lettuce set in a continuous row, a wide board may be set on edge along the row. Transplanting should be done late in the afternoon or during cloudy or wet weather, and watering should be done with hose or watering can late in the afternoon.

Start Tender Things in Paper Pots

If you have a cold-frame or a hot-bed by far the surest and in the end the easiest way to start all the vine crops—cucumbers, melons, squashes—and also pole beans and lima beans, and even extra early sweet corn, is to make use of paper pots or dirt bands, which are very cheap. Fill these with a rich compost containing plenty of humus—one-third old crumbly manure and two-thirds garden loam, with a little sand if the loam is heavy. Plant about twice as many seeds as you want plants, and thin them as soon as they are well started. It is best to water thoroughly some hours before planting. The pots used for lima beans should be watered at least a day in advance and the beans should be pushed in eye down. No more water should be applied until they are well up, or they will be almost sure to rot. All these things will sprout and grow with great rapidity in the frame. Two to four weeks is ample time to give them, as they do not transplant well if allowed to get too big. Thin out the plants in each pot to the number you want before they get too large, or the roots and tops will begin to crowd each other.

Here are a few suggestions for individual crops:

BEANS. For the first planting use the lightest, best-drained soil. If the weather is still a little wet and cold plant rather shallow—only an inch or so deep. In dry weather plant about two inches deep. Always plant lima beans, either pole or bush, eye down, and when there is no immediate prospect of rain. Plant the pole sorts in hills.

CORN. In the home garden there is little advantage in planting in hills, unless the ground is weedy or heavy. As good results may be had by planting thinly in a continuous drill, thinning the plants to about a foot apart in the row. This gives the individual plants a better chance for development than they get when they are bunched three or four in a hill.

EGGPLANTS. Do not set out until all danger of frost is

past. Keep well protected from potato bugs. Give plenty of rich compost in the hills.

OKRA. Start under glass; or plant in rich soil in hills and thin to a single plant.

PEPPERS. Do not plant until thoroughly warm weather is established and then put them in the sunniest position available. Enrich the hills well, but avoid green manure. Early varieties are the safest in northern sections.

TOMATOES. Get your plants as big and as strong as possible by shifting to paper pots during the last three weeks before setting out, so that they may have blossoms or even small fruits before they go into the garden. As soon as they are set out, stake them to prevent whipping by the wind. Keep trained up from the beginning and cut off most of the side suckers as soon as they form.

April: Fifth Week

SPRING AND SUMMER SPRAYING FOR FRUIT; STARTING THE VINE CROPS RIGHT

The day passed long ago when spraying was either an experiment or a hobby in the home garden. There is no reason for the feeling that spraying is a complicated business, requiring expert knowledge and much money. By modern methods the work is simple, easy and efficient—particularly in the home garden, for which small amounts of spray materials may be bought in the most convenient forms. There is no reason why one should not make his own stock solutions of Bordeaux mixture and kerosene emulsion; but the market carries satisfactory substitutes that require only mixing with water.

Within the last few years dry dusting has been making progress, and it is very convenient for small-scale operations. Various preparations are being improved, but some have proved either inefficient or injurious and you will be very well paid for the time and trouble you may take in dropping a line to your state experiment station for an expert opinion about any preparation that you may be thinking of using.

There is no use in doing a halfway job of spraying. Insects multiply so rapidly that unless you get practically all of them your time will be absolutely wasted. Successful spraying depends upon accuracy and completeness along three lines: First, using the special spray adapted to the purpose in hand; second, applying it at the proper time, neither too early nor too late; and third, doing a thorough job. It is necessary to cover every square inch—branch, twig and leaf, upper and under surfaces—in order to get satisfactory results.

As the same fruit or vegetable is often attacked by a number of different things several sprayings may be necessary. Often a combined spray may be used. But do not wait until you need to spray before getting your things. Have them on hand early and ready to use as soon as conditions are right.

The insects that attack fruit and ornamental trees differ not only in size and shape but also in their manner of extracting a living. Some of them chew; others suck the juices from below the outer surface of leaf or bark. Poisons will end the chewers, but the suckers must be killed by suffocation or external injury. Remedies that may be used successfully in the winter are sometimes too strong for use in summer, when the trees are in leaf or in fruit. So a number of different things must be employed to get the better of all the insect enemies and the various forms of disease with which every gardener, no matter now large or how small his place, has to contend. During the season you are pretty sure to need practically all of the following, and it will save time to have them on hand.

The Sprays You Need

BORDEAUX MIXTURE. This is the standard preventive against blights and fungous diseases. It may be bought in commercial forms, or a stock solution may be made at home without much trouble. It is frequently used in combination with arsenate of lead and sometimes with Paris green, thus being effective against both diseases and chewing insects. Make a stock solution at least half a day before it is to be used. The method follows:

Dissolve copper-sulphate crystals in water at the rate of one pound to one gallon. In another receptacle slake lime to the same amount, adding the water a little at a time until the solution is of the consistency of thick milk. To make ten gallons of spray dilute one gallon of the stock copper-sulphate solution, straining it carefully; then dilute one gallon of the stock lime solution, also straining it care-

fully, and mix the two in the tank. To make a small amount of the mixture use one tablespoonful of the copper sulphate, one and a half tablespoonfuls of lime and one gallon of water. From time to time add water to the stock lime solution to keep the lime at the bottom covered.

AMMONIACAL COPPER CARBONATE. For some uses Bordeaux is objectionable, as it marks the foliage and fruit. As a substitute under these conditions, an ammoniacal copper carbonate spray may be used. Dilute three pints of ammonia in seven to eight parts of water. Make a paste by mixing six ounces of copper carbonate with water. Mix the two until well dissolved; then stir well into fifty gallons of water. For small amounts, use two teaspoonfuls of copper carbonate, two fluid ounces of ammonia and two gallons of water. This spray cannot be kept and must be used soon after mixing.

KEROSENE EMULSION. This is an effective and safe spray to use for sucking insects, San José scale, plant lice, mealy bugs, and so forth. It may be bought in commercial form. To make at home, dissolve a half pound of soap in one quart of water. Add one gallon of water and two gallons of kerosene. Place in a pail or crock and churn or pump with a force pump until a thick, lathery cream is formed. For small amounts use two cubic inches of soap, one pint of water and one quart of kerosene. For use in spraying dilute the stock solution with five to fifteen times as much water. For dormant growth use five to seven parts water; for ordinary purposes ten parts water; for a comparatively weak spray fifteen parts water.

None of the other sprays to be used can be mixed on a small scale at home to any advantage. There are good commercial preparations of lime-sulphur and nicotine, ready for use upon the addition of water. Arsenate of lead and Paris green, for poisoning chewing insects, are too well known to need description. The former is the best to use in most work, as it sticks and may be used without danger of burning the foliage.

FRUIT	PEST	REMEDY	WHEN TO APPLY
APPLE	Apple scab.....	Bordeaux 5-5-50, or summer lime-sulphur spray.....	Before blossoms open; after petals fall; 14 days later—three sprayings.
	Apple maggot.....	Pick up and destroy all fallen fruits.	
	Railroad worm.....	Dig out with wire and kill; search in fall and spring.	
	Borer.....	Arsenate of lead, 4 in 100; or Paris green, 1 in 100.	
	Codling moth.....	Burlap bands on trunk for traps during July.	
	Cankerworm.....	Same as above; bands in April.	
	Tent caterpillar.....	Same as above; also wipe or burn nests.	
	Blister mite.....	Lime-sulphur wash; kerosene emulsion, diluted 5 times, or miscible oil, 1 in 10 gallons.	After petals fall; 20 days later—two sprayings.
	Bud moth.....	Arsenate of lead or Paris green.	
	Leaf blight.....	Bordeaux 5-5-50.....	Late fall or early spring. When leaves appear; before blossoms open—two sprayings.
CHERRY	Curculio.....	Arsenate of lead, 8 in 100. Curculio catcher.	Before blossoms open; after calyx closes; 15 days later; 15 days later—four sprayings.
	Black knot.....	Cut out and burn at once.	
	Fruit rot.....	Pick before fully ripe. Spread out in cool, airy room.	
	Borer.....	Dig out with wire and kill.	
	Yellows.....	Pull out and burn tree—replant.	
	Curculio.....	Do not spray; catch on sheets.	
	Brown rot.....	Summer lime-sulphur; open pruning; pick rotten fruit.	After petals fall.
	Leaf curl.....	Bordeaux 5-5-50, or summer lime-sulphur.	
	Blight.....	Cut out diseased branches; clean out sores; disinfect with corrosive sublimate, 1 in 1000; paint.	When fruit is half grown; 10 days later; 10 days later—three sprayings.
	Scab.....	Bordeaux 5-5-50, or summer lime-sulphur.	Before buds swell; fall or early spring.
PEAR	Blister mite.....	Bordeaux or summer sulphur.	Before blossoms open; after petals fall; 15 days later—three sprayings.
	Leaf blight.....	Same; also thin fruits so as not to touch and clean up neighboring trees.	After fruits set.
PLUM	Fruit rot.....	Jar down on sheets stretched beneath trees and destroy.	
	Black knot.....	Lime-sulphur wash; kerosene emulsion, diluted 5 times; miscible oil, 1 in 10 gallons.	
ANY	San José scale.....	Kerosene emulsion, 10 times diluted.	
	Oyster-shell scale.....		Late fall or early spring. May or June, when yellowish lice-like nymphs appear.

The type of spraying machine to buy depends upon the amount and kind of spraying to be done. For the very small garden there is a little brass hand pump that does practical work. With a suitable nozzle, a bucket pump may be used in the small home garden. For the average garden a compressed-air sprayer will be found most convenient. The knapsack type is preferred by some; but the air-tank type has the advantage of leaving both hands free.

Do the Work on a Warm Day

When many trees have to be taken care of a barrel sprayer is the one to get, if horse and wagon are available. Otherwise a hand sprayer of the new wheelbarrow type, which has large capacity and can be moved easily from place to place, will be found the thing. You should have two or three types of nozzles for the different kinds of spraying you will have to do, and an extension pole of suitable length for the fruit trees.

A few points about spraying must be kept in mind: Be sure that you have the spray adapted to the particular thing you are trying to fight; be sure that the material is right for the conditions you have to meet—kerosene emulsion or lime-sulphur that would be right to use in winter might be strong enough to ruin your trees in summer. If possible do the work on a fairly warm day, when little or no wind is blowing, though you must not delay the spraying to be given just before the blossoms open and just after they fall. Spraying when the blossoms are open is usually undesirable. There are a few days after the petals fall before the calyx of the forming fruit closes; to be effective, spraying must be done while the material has access to the inner part of the calyx, and while the forming fruits are still turned upward. If the calyx has begun to close, the eggs or young worms, especially of the codling moth, will be protected from the spray. Sprays like Bordeaux mixture are efficient only when all foliage and stems are kept coated with the mixture; therefore it must be applied

often enough to take care of new growth as soon as it is made.

The more common and most injurious of orchard and fruit-garden troubles may be identified as follows:

APPLE SCAB. Dark-green, round, furry spots on the young fruit; worse in cold, rainy seasons. Use Bordeaux mixture or summer lime-sulphur, in spring or summer.

BLISTER MITE. A spider-like insect causing on the leaves light-green blisters that turn to red or brown; leaves finally drop. Use strong lime-sulphur, miscible oil or kerosene emulsion in early spring.

BUD MOTH. A light-brown caterpillar about quarter of an inch long, with dark head and legs. Use arsenate of lead or Paris green as buds open.

TENT CATERPILLAR. Hatches in early spring and grows rapidly, forming tents or nests in the crotches of trees. Wipe out or burn nests. Use arsenate of lead or Paris green in early sprays.

CANKERWORM. An "inch-worm" that attacks apple trees. Appears in May and June. Use arsenate of lead or Paris green and put bands round the trunks of the trees in April or May.

CODLING MOTH. A small, dull-brown, night-flying moth; the parent of common apple worms. Except in the northern sections there are two broods. Use arsenate of lead in three applications and apply tree bands in July.

CURCULIO. A small, gray-mottled, shelled beetle with four distinct humps on its back. Attacks practically all orchard trees, drilling holes in newly formed fruits in which the eggs are laid. Arsenate of lead spraying is partly successful; or the beetles may be shaken down in the morning. A weaker spray must be used on peaches or plums. Lime-sulphur acts as a repellent.

CURRENT WORM. A small, green, greedy worm that attacks gooseberries and currants. Usually appears first on lower leaves. Arsenate of lead or Paris green will kill early broods; use hellebore for later ones.

ELM-LEAF BEETLE. A dull-yellow beetle about three-

eighths of an inch long, with a black stripe on each wing. The old beetles feed on young leaves, eating small irregular holes. In May and June they lay eggs which hatch into larvæ that do the real damage, making the leaves turn brown so the tree looks as if it had been burned. The larvæ pupate in the ground in July, and in a few weeks hatch into a second crop of beetles. Spray thoroughly with arsenate of lead when the leaves are well out, and again as the eggs hatch, using one and a half to two pounds to fifty gallons of water.

LEAF HOPPER. A blunt-headed, long, yellowish, hopping beetle that lives by sucking. It works on the under side of the leaves, causing them to wither and dry up. Use kerosene emulsion on the first appearance of the pest.

SAN JOSÉ SCALE. The most destructive of all the scales, attacking practically all fruits. The individuals are very small, but they form colonies which give a scurfy ash-gray appearance to the bark. On the fruit a small red circle surrounding the scale is very perceptible. Dormant or winter sprays are the most effective. Lime-sulphur in early spring will help.

OYSTER-SHELL SCALE. This is larger but not so serious in effect as the San José. The young hatch out in May, and spray should be applied as soon afterward as possible, as they are for a time unprotected by the scale. Look for yellowish lice-like insects that are quite active for a short while after hatching and then attach themselves to one place. Spray also as for San José.

BLACK ROT. This appears as a black or brown decay, starting in a small spot and rapidly spreading until the fruit becomes mummified. Spray grapes with Bordeaux mixture until the middle of July, then with ammoniacal copper carbonate solution. If you have only a few vines protect each bunch of fruit with a manila bag. For plum, peach and cherry trees use Bordeaux mixture or summer lime-sulphur. Thin out any fruits that may touch.

LEAF BLIGHT. This attacks the newly forming leaves of peach trees early in summer, causing them to shrivel and

color and drop prematurely, even during June and July. Use of lime-sulphur before the buds swell is effective. After the leaves are out care must be taken not to get the spray too strong.

MILDEW. For most forms in the fruit and vegetable gardens Bordeaux mixture is effective. For gooseberries potassium-sulphide spray is better.

RUST. This attacks various things, assuming several forms and causing a burned or blighted appearance of the foliage. Use Bordeaux mixture, lime-sulphur, or ammoniacal copper carbonate solution.

Start the Vine Crops Right

The vine crops—cucumbers, squash, etc.—should all be planted in specially prepared hills, whether seeds or plants are used. These hills should be prepared as follows: Mark out rows, four to eight feet apart each way, according to the crop and variety to be grown, and with a hoe scrape out hills four to six inches deep and eighteen inches or so across. Into each hill put a forkful or two of thoroughly rotted manure or compost, mixing it well with the soil. If no manure is available a mixture of tankage or guano, bone dust and cottonseed meal may be used, two or three handfuls being well mixed with the soil. The hills should be made deeper where manure is to be used. Then fill in with good soil until the hill is as high as, or, if the soil is wet, slightly higher than, the soil level, but flat on top.

Plant twelve to twenty seeds of cucumbers or muskmelons, eight to twelve seeds of watermelons or summer squash, and six to eight seeds of winter squash or pumpkin.

In setting out any of the vine plants from pots, even when they have been carefully grown in dirt bands, the job must be managed carefully or they will wilt badly. Use plenty of water, and shade for a day or two. A supply of tobacco dust should be kept on hand, so that the ground may be sprinkled as soon as the plants begin to push through, and this should be used freely from then on as a preventive for striped beetle and other enemies.

May: First Week

CARE OF ASPARAGUS; RHUBARB; SEA KALE; THE CANE FRUITS; GRAPES; THE NEW STRAW- BERRY BED; FALL FRUITING STRAWBERRIES

Most gardeners find it more interesting to plant a new crop, or start a new bed of perennial things, than to take care of the old plants. But it is by no means more important. A full share of spring attention should be given to the permanent crops—asparagus, rhubarb, sea kale, strawberries, gooseberries, currants, raspberries, blackberries and grapes. All these crops must be grown a year ahead. To put it another way, the amount and quality of the crop you get this year depend more upon the way you took care of the plants last season than upon anything you can do now. By the same token, if you want a good crop next year you will have to prepare for it this season. This does not mean, however, that you can neglect the plants this spring.

A well-made and well-cared-for asparagus bed should last fifteen years; many beds still giving good yields have been cut for thirty years. But these have not been neglected. If a bed is once allowed to run down it will very quickly run out entirely. Work should be begun early in spring. If the bed was mulched last fall the manure should be worked into the soil as soon as possible, especially between the rows. A mistake commonly made in taking care of asparagus beds is to sow manure or fertilizer directly along the row, thus inducing the roots to grow near the surface, which is just the thing that is not wanted. If the bed was properly planted the crowns should be from four to six inches below the top, so the whole bed, rows and all, can be worked over with the wheel hoe or cultivator. In the home garden it is an easy matter to cultivate deeply between

the rows, and shallow enough in the rows so that you will not dig into the crowns or break many of the large fleshy roots. But go over the entire surface. If you like your asparagus blanched white a ridge may be thrown up along each row at this time, to be worked down later when you have stopped cutting.

Even among authorities there is some difference of opinion as to the best time to apply manure and fertilizer to the asparagus crop. But all are agreed that a great deal should be used, and that there is practically no danger of the home gardener's getting on too much. Commercial growers sometimes use as much as three tons of fertilizer to the acre, which would be sixty to seventy pounds for a ten-by-fifty-foot plot. When a good dressing of manure is used it is not necessary to use so much fertilizer. A high-grade complete fertilizer, with an analysis of 4-8-10, will answer. About a third of the fertilizer and manure should be applied when the bed is worked over in the spring. As soon as the shoots start give a top dressing of nitrate of soda—two to four pounds to a ten-by-fifty-foot bed—and repeat this two or three times during the cutting season.

Not the least of the things to know about asparagus growing is proper harvesting. There is always a great temptation, especially during the first two or three seasons, for the gardener to keep on cutting longer than he should. Even when the bed is well established the cutting season should not extend more than six to eight weeks, and half that time is plenty for the first two or three seasons.

Cut Regularly During the Season

In cutting care should be taken to insert the knife as perpendicularly as possible until the desired depth is reached. If the knife is thrust in diagonally some distance from the stalk you run the chance of cutting off the tips of other sprouts that are just starting below the surface. A mistake commonly made in the home garden is to let the stalks go for two or three days if they are not needed for immediate

use, with the result that they are not only wasted but also use up the energies of the plant. Cut all stalks as soon as they are large enough. If you stand them in a cool place, with the butt ends in cold water, they will keep plump and fresh for several days. During the cutting season, which usually lasts into June, the bed should be worked over occasionally to keep all weeds out and to preserve a dust mulch. Sometimes a few spears are allowed to grow to serve as traps for the asparagus beetle, which in some sections is very troublesome.

As soon as the cutting season is over, the balance of the manure and fertilizer should be worked in and the last dressing of nitrate of soda should be given. Cutting should always be stopped if the shoots appear to be getting tough. The tops should be cultivated and looked after as carefully as if they were to be eaten, for their function is to store up in the crown material for the next spring's supply of shoots. The asparagus beetle may be controlled by spraying with arsenate of lead. In a well-tended bed asparagus rust is seldom troublesome. If it does appear mow the old bed carefully, after the tops have turned brown but before they become brittle, and burn them carefully. When the plants are given plenty of moisture rust seldom appears. The beds may be mulched or not in the fall, but do not put on fertilizer at that time.

Spring Work in the Berry Patch

Whether the strawberry patch is a new one set out last month, or one that was set out last year and will come into bearing for the first time this June, or an older bed that you are trying to keep up as long as it will bear satisfactorily, it will need considerable attention if you are to get really good berries.

The newly set bed should be kept well cultivated, so no weeds will have a chance to get a start. Plenty of moisture is required, so it is important that the soil mulch be kept up. The cultivation may be quite deep at first—three inches or

so—but as the plants begin to make strong growth and fill the soil with roots only surface cultivation should be used. When a horse is available no tool is better than a twelve-tooth cultivator, with a leveler attachment in the rear; this leaves the surface almost as finely pulverized as if it were raked. When the hand wheel hoe is used, the wide hoes or sweeps, which cut all weeds off clean over a strip of considerable width, will be found very useful. If the plants have been set to grow by the hill system the greatest care must be taken to pinch off all runners as soon as they form.

The very finest berries, and just as many of them, may be had by keeping the plants single and throwing the whole strength into individual crowns. But there is no use in attempting this method of culture unless you are willing to tackle the task of keeping the new runners pinched off. In the matted-row system, which is usually followed, the first runners from each plant are allowed to root, being spread so that the plants will be as equally spaced as possible. After that, the runners are kept cut or pinched off, so that an alley for cultivating and picking is maintained between each two rows.

If your bed is coming into bearing for the first season push the mulch aside gradually when there is no longer danger from late frost, so that the plants and fruit stalks will grow up through the mulch, and the berries, when they become heavy enough, will lie upon it. Moving the mulch prematurely often results, if there is a late frost, in the loss of practically the whole crop. Any weeds that come up through the mulch should be removed by hand to prevent their going to seed.

As soon as the plants are through bearing, the mulch should be removed and the bed should be given a thorough cleaning. It should be kept clean until the end of the season, if you hope to get a good second or third crop. Older beds are handled in much the same way. Sometimes it is feasible to cultivate out the centers and in this fresh soil root new plants from the old rows on either side. As soon as the new

plants are well established cultivate out the original rows and make them the centers.

Fall-Fruiting Strawberries

There are now several varieties of fall-fruiting or ever-bearing strawberries that are decidedly worth cultivating, so there should be a small patch of them in your garden. Plants set out this spring—it is not too late to set them now if you get at the job immediately—will bear this fall. They should be given ordinary methods of culture and any flower stalks that form up to the middle of July or first of August should be pinched out. Besides this fall's crop the plants will bear again next spring, and then fruit again in the fall, although of course to get the largest fall crop the plants should not be allowed to exhaust themselves by fruiting too heavily in the early summer. Progressive and Superb are the best varieties so far developed.

The only disease likely to cause trouble with strawberries is rust or blight. It occurs first as spots on the leaves, which turn a reddish or brownish color and finally die. When there is reason to fear it spray four or five times during the first season with Bordeaux mixture; spray early in the spring of the second season just before the blossoms open, and again just after blossoming. Be careful to set out only clean, healthy plants.

Rhubarb and Sea Kale

The rhubarb patch should be cared for in much the same way as the asparagus bed. It will not pay to fertilize so heavily, but the few plants in the home garden are not likely to be harmed much. Early in spring work a dressing of manure into the patch and give it a generous dressing of nitrate of soda. The value of the manure comes largely in forming a moisture-saving mulch that will last until one is through pulling the stalks. The dressing of soda should be repeated two or three times to help produce stalks of the

largest size and best flavor. Break off any seed stalks that appear. Good culture during the latter part of the season, after you have stopped using the stalks, will tell in next year's crop. Fertilizer and manure may be applied during late June and the benefits will be very apparent the following spring.

Sea kale is also grown in much the same way as asparagus. To be of good quality the shoots must be blanched by making a mound of sand or soil over each plant in the spring. This must be leveled when the plants are allowed to begin to grow. Fertilizer and cultivation should be given for the following spring.

The Cane- and Bush-Fruits

The beds of cane fruits should be gone over in the spring and all old canes removed if this was not done in the fall. Of the new canes only three or four should be left to each plant. These should be headed or cut back to induce the growth of the laterals, which bear the fruit, and to make the plants more self-supporting in case trellises are not used. Supports are preferable. A good stout stake should be used as a support for each plant, and the canes should be tied loosely to this with some soft material. For long rows, a convenient method is to stretch two parallel wires a foot or so apart, and keep the growing canes between these.

Cultivation should be frequent but very shallow, as these plants all root rather near the surface. They all require plenty of moisture, and manure is therefore especially valuable as a fertilizer. Bone meal is also excellent. The enemies of the cane fruits do not do serious injury. The most serious is rust or blight. All diseased plants should be carefully cut out and burned, and the rest of the plants sprayed with Bordeaux mixture. The borer, which gets into the canes and burrows up the center, is controlled by cutting out and burning the canes as soon as attacked. The borer is the larva of a small beetle, and is active in mid-summer.

Gooseberries and currants, to produce good crops, are insistent upon an adequate supply of moisture, and as soon as dry weather sets in they should be mulched. Both should be thinned out so that air and sunshine have free admission, and trailing branches should be cut off well above the ground. When they are allowed to make too much wood, and become brushy, good fruit cannot be expected.

During the summer the new growth on currants should be gone over, and all except the few branches that will be wanted for fruiting in the future should be cut out. Those that are saved should be cut or pinched back slightly at the tips, which will check growth and cause them to ripen up better in the fall. Black currants are an exception, as their fruit is borne in part upon one-year-old wood. Powdery mildew, often a serious trouble to gooseberries, may be controlled by a spray of one ounce of potassium sulphide, or liver of sulphur, dissolved in two gallons of water. Use soon after mixing, and repeat every ten days.

A Bag Over Each Bunch of Grapes

The ground should be worked up lightly about the grapevines and some manure or fertilizer worked in. Bone is especially good. A little later, after growth starts, all eyes or buds appearing below the laterals to be trained as permanent fruiting canes should be rubbed off. To control black rot clean up the ground round the vines early in the spring and burn all the old pieces of bark, twigs and "mummied" fruit. A Manila bag fastened over each bunch of fruit will give protection.



PLATE 11.—You must keep your bushes well pruned if you want good currants and gooseberries. Don't make the common mistake of merely trimming back the whole plant like a hedge; thin it out back to the back base of the plant, leaving only strong, new wood, and not too much of that.



PLATE 12.—Don't trust to the general appearance of your plants to determine whether they are free from insect pests. Examine the *under* side of the leaves frequently and you may discover a condition like that in the picture above where the white fly has had a strong start without giving any indication of its presence to the casual observer. (Lower) A compressed air sprayer of the shoulder strap type like that shown herewith is most convenient and will take care of a large amount of spraying. Get an angle nozzle with your outfit.

May: Second Week

FLOWERS FOR THIS SUMMER'S BLOOM. PLANTING ROSES; BABY RAMBLERS; DAHLIAS; ASTERS

Probably no job in the year's round of work gives results so certain, so immediate and so satisfactory as setting out growing plants from pots for the summer's bloom. The garden that is bare, brown and barren in the morning may by the use of a few dozen geraniums and edging plants be transformed into a beautiful spot by afternoon. But the effects depend as much upon the way the plants are used as upon the money spent for them. Setting out a lot of beautiful plants does not necessarily make a beautiful garden. In nine cases out of ten the most pleasing effects are produced with the most simple use of materials—only one or two colors in a bed and the most simple and natural arrangement of the plants.

In buying plants it is best to make personal selection, if you have had enough experience to know just what kinds of plants will give the best results. Most persons insist upon having plants that are in full bloom, and go upon the principle of "the bigger the better." For bedding purposes a plant well set with buds is much better than one in full bloom, and so long as it is stocky, shapely and thrifty, size is of secondary importance.

On the other hand, the condition of the roots, which are seldom examined, is of the utmost importance. The roots should be in about the same condition as in the case of plants ready to repot—a good ball of active, light-colored roots. If the plants have recently been repotted, so the root balls have not formed, they will be checked considerably in being set out. If the plants are so old that the roots

have become stringy and tough they will never give so satisfactory results as actively growing young plants, although they may make several times as much show on the greenhouse bench.

In getting your supply of the standard things try a plant or two of some of the newer varieties. A good plan is to get these in small sizes, as they are usually expensive, and grow them on in the pots, set into the ground throughout the summer. They will then be in fine condition to take into the house in the fall and will bloom all winter.

Some Good Geraniums

The geranium is still the leading bedding plant. One of the main reasons for its unceasing popularity is its health. But the splendid new varieties of this old favorite are not nearly so well known as they should be. Try a few of them this spring. If your local florist hasn't them in stock send for a few from some reliable seedsman. They will not only be a source of pleasure this summer, but if looked after with reasonable care will make ideal house plants next winter.

Some of the best are Marquis Castellane, deep brick red; Berthe de Presilly, light pink; Dagata, extra large clusters of mauve rose; Mme. Récamier, one of the best of the pure whites; Mrs. E. G. Hill, salmon-colored single; Snowdrop, white single; Paul Crampell, single scarlet. S. A. Nutt, still the most popular, dark crimson bedder, and Beauté Poitevine, deep salmon pink with enormous clusters, have retained their lead in their particular colors for more than a quarter of a century.

Though the geranium will stand more neglect than most flowers, it will answer most readily to good care in the way of feeding and cultivation. The only thing to avoid is too much nitrogenous plant food, in the shape of manure that is not thoroughly decayed, or too much nitrate of soda. An overdose of either will cause too many leaves, with poor flowers.

Set Out Potted Roses This Month

Of all summer-blooming flowers the rose is still without a rival. Yet thousands of plants set out each year never give any return that is worth the original cost of the plant, to say nothing of the time and care spent on them. The rose is easy to grow, but it will not grow itself. Only a reasonable amount of care is necessary to get satisfactory results, but without this care there will be no results.

This month is the best time to set out roses from pots. These potted plants give the most satisfactory results, and are being used more and more in place of dormant stock that has to be set early in the spring. From plants set out in May you may get roses in June—if the plants are good and of the right size, and if you give them congenial conditions and protect them from insects.

Of course you must exercise care in buying roses. Prices vary greatly, but you cannot afford the risk of being guided by price alone. Be sure, first of all, that you deal with houses of good reputation; then carefully compare the descriptions—size of the pots, age, and so forth—before deciding where you will be likely to get the most for your money. A dozen good plants will give much more satisfaction than three dozen poor ones. Do not lose sight of this fact if tempted by low prices. On the other hand, you can save money by not confining your order to the newest varieties. Some of the comparatively old sorts, such as Frau Karl Druschki, a pure white rose that for garden use is still unsurpassed; General Jacqueminot, crimson; Magna Charta, clear dark pink; and Eleric Brunner, bright red, are as good for the beginner as any of the newer varieties.

All those named belong to the class of hybrid-perpetual roses, which are the hardiest and the surest to give results in the outdoor garden. They bloom only once in the season, with possibly a few scattering blooms in the fall. The hybrid teas are a cross between the hybrid perpetuals and the tender teas, and bloom abundantly in June and more

or less throughout the summer. They are known as "monthly roses." In the Northern States they must be given protection.

Among the popular hybrid teas are General McArthur, a vivid scarlet; La France, satiny pink; Kaiserin Augusta Victoria, white, tinted with lemon; Killarney, brilliant pink; Lion, deep coral pink; Château de Clos-Vougeot, rich scarlet and a steady bloomer. Roses grown in the standard or tree form are very effective. Hybrid perpetuals are the most satisfactory for this purpose.

The tea roses, while deliciously fragrant, are not so hardy as the hybrid teas and have been to a large extent superseded. A few of the beautiful sorts that are suited to garden culture are: Harry Kirk, yellow; Maman Cochet, deep rose pink; Souvenir de Pierre Notting, canary yellow; White Maman Cochet; William R. Smith, pinkish white; and the new coppery yellow Lady Hillingdon, which is proving good for garden use.

Dwarf Ramblers for Borders

For bedding or low borders or where roses are wanted in combination with other flowers, the Polyantha and dwarf rambler roses are the best to use. They are the hardiest and the most steady flowering of all. Many of them are only eighteen to twenty-four inches high, and they require practically no pruning but the removal of old wood and old flower stems. They are good for use in pots as well as in the garden.

When your rose plants for the new bed arrive unpack them carefully and examine the roots to see if they have become dry in transit. If so, water them carefully or set the balls into a shallow pan of water and let them absorb enough to get thoroughly moist again without getting muddy. If the plants cannot be set out immediately, keep them in some place where they will get plenty of air but will be protected from the wind and the full, strong sunlight. If

they cannot be planted for some days make a shallow trench in a cold frame or in some protected spot deep enough to hold the balls of earth and cover them in firmly with soil.

Hybrid perpetuals are usually planted twenty-four inches apart, and hybrid teas eighteen inches apart. In setting them out the top of the ball of earth should be set about two inches below the soil level. Be careful not to use commercial fertilizers directly in the hole. A little bone meal or ground bone may be mixed with the soil, although it is better to do this a week or so in advance.

Without doubt the greatest cause of failure, when good plants are used, is careless planting. Three essentials to success are: Have the roots in proper condition, neither too wet nor too dry; set them out in moist soil—put water in the bottom of the hole before planting if the bed is very dry; and set the plants in firmly. Press down round each one with your full weight after planting.

After planting, the only care necessary until blooming time is to keep the plants well cultivated and well sprayed. Every ten days or so use a combined fungicide and insecticide, such as Bordeaux and arsenate of lead, or some similar preparation that will not be so conspicuous on the foliage. This spray will usually prevent mildew or blight, and chewing insects. If the aphids appear spray with some form of tobacco extract or with kerosene emulsion, or use tobacco dust.

Keep up with the Dahlias

The dahlia is an old favorite, but one has to step lively to keep up with it. Few plants have been developed into so many new and really different varieties of merit during the last few years as have dahlias. To make an intelligent selection among the bewildering number of new sorts, first fix in mind the different types: The cactus-flowered section, which is the most popular, has long frilled or curved petals, which are much more graceful and airy than the older forms. The peony-flowered type is also open and

graceful in appearance, but the petals are much wider than those of the cactus. The decorative dahlias are more stiff and regular in form, and come about halfway between the cactus and peony types; and the show dahlias, the older form, are so formal in appearance that they look like artificial blooms.

The pompons are beautiful little dahlias which are valuable for many purposes on account of their small size. The collarettes are distinct in appearance, the flowers being formed by a row of broad outer petals with an irregular collar of cactus-like petals inside, round the heart of the flower, and usually of a contrasting color. Many of the singles are very beautiful and particularly valuable for cutting, or for use with other flowers in bouquets.

Dahlias may be bought either started in pots or as dormant roots. The plants should not be set out until all danger of late frost is past. The bulbs may be planted two weeks or so earlier. Many persons make the mistake of planting the whole clump of roots that was saved from the year before. These clumps should always be divided, if the best flowers are wanted, even if you have to throw away three-quarters of the bulbs for lack of room.

Keep a piece of the old stalk with each root planted to be sure that you have an eye with it. The root should be planted three or four inches deep and laid flat. A good plan is to fill in only part of the covering soil at first, filling in the rest as the plant grows. For good flowers all the shoots except one or two should be pinched out as soon as they are well started; if this is done early it will induce the formation of strong side branches low down, lessening the danger of breaking later on. For extra large blossoms the plants should be kept well disbudded.

Supports of some kind should be given early to guard against damage by heavy winds or rains, as the stems are rather brittle. The plants should be set several feet apart to insure plenty of room. Dahlias grow well in almost any soil provided plenty of plant food and water is given. They need an abundance of moisture, no matter how rich the soil

may be. To keep up the quality of the blooms until the end of the season the plants should be fed after they have been in blossom for a while with additional dressings of bone dust and a little nitrate of soda.

Buy Early and Late Asters

The aster is another flower which if set out now will give an abundance of bloom throughout the latter part of the summer. In buying plants try to get both early and late blooming types. And get some plants of a named variety—they will be worth the extra price. Though asters will grow and bloom in poor soil, they will respond readily to good culture. For large blooms they should be kept disbudded and given plenty of plant food and water.

Usually the only trouble in raising them is the aster beetle, which appears after the plants are well along. Heavy applications of tobacco dust will repel him if used in time, and if there are other plants in the vicinity. Arsenate of lead, used extra strong, is effective; it is better to spoil such flowers as may be open than to risk losing the whole crop. Hand picking of the beetles is the surest and quickest method, and if there are not too many plants it is to be recommended.

May: Third Week

FERTILIZING, WEEDING AND THINNING IN THE VEGETABLE GARDEN; POINTS ON PICKING

The importance of side-dressing and top-dressing growing crops in order to get big yields is not generally appreciated by the home gardener. Fortunately he needs no additional equipment for this work except an old pail and the knowledge of what to use and how to use it.

Nitrogen is more likely to be deficient than any other plant food, particularly during the earlier stages of growth, while the stalks and leaves are being formed. The cheapest and most efficient form in which nitrogen can be supplied is by the use of nitrate of soda. This material looks and acts like coarse salt, but contains from fifteen to sixteen per cent of available nitrogen. The result of an application of this material under favorable circumstances is often distinctly perceptible in twenty-four hours. It should be applied only in very small doses, otherwise the plants will not be able to make use of it fast enough to prevent waste.

For most garden crops two to four applications at intervals of two weeks to a month, according to the condition of the crop and the length of time normally required for it to mature, should be made. For fruit crops, such as tomatoes, beans and vines, the last application should be made at the time the plants are coming into full bloom—otherwise an overgrowth of leaves and vine may be induced at the expense of the fruit. A leaf crop, such as lettuce, cabbage or spinach, is in little danger of getting too much. Enough nitrogen should be supplied to the root crops, such as onions, carrots and parsnips, so that growth is never checked. More nitrogen should be supplied during a dry season or in a garden where manure has not been used.

Nitrate of soda is very powerful and it often causes great damage in the hands of a careless or an inexperienced gardener. A small lump of it will burn a hole through a tough rhubarb leaf or will kill a small plant. From 100 to 200 pounds an acre—one pound to each 200 square feet—at each application will be sufficient. It may be spread round the plants and hills just before a rain, or it may be dissolved in water—a tablespoonful to a ten or twelve quart watering can.

Liquid Manure Gives Good Results

Liquid manure is also rich in nitrogen and is of special value for backward crops or flowers. The best material for making it is cow manure, although stable manure or poultry manure will do. The main objection to its use is that it is disagreeable to handle, but this can be to a large extent eliminated by the following method:

Get a large barrel or a keg and bury it a third or a half in the soil, preferably in a shady spot, and of course as much out of the way as possible. Fill this about one-fifth full of manure, and add water until about two-thirds full. Use this as a stock solution, adding water when needed. It may be taken out with a dipper tied to a wooden handle of convenient length. A dipperful or two poured into a watering can full of water will produce very satisfactory results. If an old funnel and a piece of coarse bagging are kept on hand the liquid manure may be strained, and this will prevent clogging of the sprinkler. Free use of this manured water round roses and other flowers for cutting, as they begin to come into bud and bloom, will give splendid results.

A shortage of nitrogen is shown by a lack of the dark-green color that normal leaves should show. If an application of nitrate of soda or liquid manure does not cure the trouble, a more general tonic may be needed. For this purpose, bone flour and genuine guano are good. Being less soluble than nitrate of soda, they should be stirred well into the soil by cultivating.

Potash is particularly desirable when a crop does not ripen so fast as it should. It is often used late in the season round small fruits or in orchards to hasten the ripening of the wood as well as the crop. Either muriate or sulphate of potash, or good unleached wood ashes, may be used as the top-dressing under such conditions.

Make the First Weeding Thorough

The most critical period in growing most of the vegetable crops is during the week or ten days after they break ground. Every hour of work neglected at this time means several hours of drudgery later. The best time to kill weeds is before they are large enough to be seen. With the wheel hoe, iron rake or ordinary hoe you can destroy a hundred weeds that have just sprouted and have not yet got their true leaves in the time required later to pull out half a dozen by the roots. Weed early—that is the secret of being able to take care of your garden with the least possible trouble. And weed clean.

Presumably your garden was planted on a freshly raked surface. Any weeds that had started at the time were destroyed, so vegetable and weed seeds had an even start. But some vegetables take a comparatively long time to come up—notably onions, parsley, celery, and most of the root crops. It is therefore a good plan, if the rows are plainly enough marked, to go over the ground between the rows before the seed crops are up.

In any case you should begin operations as soon as the vegetable seeds have sprouted. The wheel hoe should be used and care must be taken not to throw any dirt over the tiny seedlings. Either the disk attachment, or hoes with high guards at the sides, should be used.

The first hoeing will make your garden look very neat and clean, but don't deceive yourself—hand weeding will be necessary for all row crops, and to a lesser extent for the things planted in hills. This hand weeding is often poorly done in two respects: Some weeds are broken off instead of

being pulled out by the roots; and strips and spots of soil where there are no weeds at all are left undisturbed.

A row gone over in this way will appear thoroughly done; but every weed broken off instead of being carefully pulled out by the roots will come back stronger than ever, and the spots where no weeds were visible are likely to be green with them within a week. It always saves time and work in the end to break up every square inch of crust and to destroy every weed the first time over. A small hand weeder helps considerably in this work—the kind with a strap to slip over one finger, so that the thumb and forefinger can be used without dropping the weeder, is a most convenient time-saver.

“Thin Out” Early for Best Results

After you have the best of the weeds, the next thing is to thin out properly. A plant out of place is a weed, and every extra onion, carrot, parsnip, stalk of corn or cucumber is a thief of plant food and room and should be pulled up before it gets big enough to do damage. Beans should be thinned to three or four inches apart; beets to three inches apart; carrots, two to three inches; corn, three or four stalks in a hill, or eight to twelve inches apart in the drill; cucumbers, two or three plants in the hill; kohl-rabi, three to four inches apart; lettuce, six to twelve inches—by thinning out first to six inches and then using every other plant; onions, two to four inches, but do not thin out until the maggots have got through with them; parsnips, three to four inches while still small; peas, four to six inches—where the seeds have come up strongly these are often left much too thick; radishes, half an inch to an inch for the spring sorts, and two to four inches for the summer and winter kinds; muskmelons, two or three vines to a hill as soon as well started; squashes and pumpkins, two or three vines to a hill; spinach, two to four inches except New Zealand, which requires much more room; Swiss chard, six to ten inches; turnips, three to four inches, thinning very early, especially when the seeds have come up thickly.

Make Your "First Pickings" Early

A common mistake is to wait too long before eating the various vegetables. Most things should be used as soon as they are large enough to pick. Don't wait until they are as large as the ones you would buy in the market. The commercial grower lets his things attain a certain size because the market demands that size.

Begin on your bush beans as soon as there are enough to make a mess. The first cabbages may be used before the heads have become solid. Watch your cauliflowers carefully, tying the leaves over the heads as soon as the latter begin to form, then use them before the heads show the first sign of breaking. Begin to remove carrots as soon as they are a half-inch or so in diameter, which will leave more room for the others to grow. Corn should be allowed to become fairly firm, but not hard.

Cucumbers, after the first two or three pickings, will probably keep ahead of the demand, *but keep them all picked* if you want the vines to continue bearing. Kohl-rabi begins to deteriorate rapidly soon after it reaches two or three inches in diameter. You will have to use lettuce early and fast to keep some of the last heads from shooting to seed. Begin on the peas as soon as they are large enough to pay for shelling. And pull radishes as soon as they are large enough to wash.

Swiss chard may be cut every few days if you take only outside leaves. If there is more than you want let some of the plants grow and use the large mid-ribs stewed, like celery. Use the turnips as soon as they are large enough to peel and cook. Summer squashes should be picked before the shells begin to get hard. Tomatoes may be picked as soon as they begin to color up; place on a sunny shelf to ripen.

May: Fourth Week

CONTROLLING INSECTS AND DISEASES IN FLOWER AND VEGETABLE GARDEN; SPRAYS AND SPRAYERS AND THEIR USE

There are a few standard remedies that can be used successfully against most garden troubles—if they are used in time. In many cases prevention must be relied upon instead of cure; this is particularly true of the diseases. Most of the garden insects first appear in small numbers, and propagate on the plant, so you must keep sharp watch at all times. Look for trouble whenever you walk through your garden, and when you see a leaf curled up, or a yellow spot, or a plant that looks a bit sick, do not rest until you have discovered the cause of the trouble.

First, find out whether the trouble is caused by an insect or by a disease. In most cases an insect will be to blame. There are three general divisions of insect enemies: The chewers; the suckers; the root workers and borers.

The *chewing insects* are readily recognized, as the results of their work are at once visible. They include slugs and caterpillars and such pests as the potato beetle and the cabbage worm. Most chewing insects can be successfully combated with poisons applied to the foliage which they eat.

The *sucking insects* include scales and plant lice of various kinds, and the nymphs or young of some of the other insects, such as the squash bug and the white fly. These must be either asphyxiated or destroyed through the action of some external corrosive. Neither the chewers nor the suckers are likely to do much damage unless allowed to multiply, which, under favorable circumstances, they do with the utmost rapidity.

The *root workers and borers* are the hardest to get at and a comparatively few of them can do great injury. Among these are the blue root aphid, the cabbage and onion maggots, and the squash borers. As the first sign of these intruders is the result of their work, the time has usually passed for effective remedies. Preventives, and destruction of any insects that may appear before they go to any other plants and continue the damage are the only courses to follow.

Rogues' Gallery for the Vegetable and Flower Garden

APHIS. Attacks peas, melons, roses, and so on. Use nicotine preparations, or kerosene emulsion, two or three applications at intervals of three or four days, reaching under sides of leaves.

ASPARAGUS BEETLE. Use arsenate of lead on summer foliage; cut and burn all vines in late summer.

ASTER BEETLE. Use arsenate of lead, strong; or pick by hand in early morning while bugs are still groggy.

CATERPILLARS. Various kinds attack cabbage, tomatoes, tobacco, and so on. Use arsenate of lead, Paris green or hellebore; or pick by hand.

CUCUMBER BEETLE, yellow and black striped. Use tobacco dust as preventive; beetles carry the germs of wilt. Pick by hand the first bugs in early morning. Spray with nicotine sulphate.

CUTWORMS. Fat, sluggish, ground worms, brown with dark stripes, cutting through stems of many plants, especially when just up or newly set out. Trap under pieces of shingle or flat stones; or scatter about toward nightfall a mash made of one quart of wheat bran, one teaspoonful of Paris green or of white arsenate, one teaspoonful of a cheap molasses, mixed with enough water to make a mash. Careful search round a newly cut plant early in the morning will usually uncover the marauder near the surface.

FLEA BEETLE. A small, hard-shelled, jumping beetle, which punctures leaves of tomatoes, potatoes and seedling

plants. Use tobacco dust or kerosene emulsion on seedling plants; Bordeaux and lead on tomatoes and potatoes.

MEALY BUG. A scale-like insect with cottony covering, attacking some flowers. It seldom appears in the vegetable garden. Use kerosene emulsion; or apply alcohol with a small brush.

POTATO BEETLE. Use arsenate of lead or Paris green. On eggplants use lead only, and pick by hand.

ROSE BEETLE. Pick by hand and use strong arsenate of lead.

SQUASH BUG. A lively, flat, black fellow. Use tobacco dust, or pick by hand to get rid of old bugs and eggs; use kerosene emulsion or nicotine sulphate for the young ones.

SQUASH BORER. Slit stem near base of plant, and destroy the borer. Cover wound with fresh soil.

WHITE FLY. Attacks tomatoes, vine crops and some flowers. Not conspicuous until large numbers have propagated. Use tobacco dust as repellent; spray with nicotine preparations and kerosene emulsion.

MILDEW. Attacks cucumbers, melons, Lima beans, roses and other flowers. Dust with flowers of sulphur to prevent spread. Use regular Bordeaux-lead spray as an effective preventive through the season.

BLIGHT, affecting cucumbers, potatoes and other things, in various forms. Spray with Bordeaux frequently enough to keep all new growth covered. Dust with sulphur-lead preparations.

ANTHRACNOSE, "leaf spot" or "rust," attacking beans, tomatoes, celery and some flowers. Use Bordeaux mixture or summer-strength lime-sulphur; or ammoniacal copper-carbonate solution to avoid stains on foliage and flowers.

The various diseases belong to two distinct classes. Most of them are parasitical—that is, the effect of the introduction and rapid multiplication of some injurious bacteria. A few diseases seem to attack the whole plant system from root to the tip; these are called "constitutional," and little can be done against them except to keep the plants in vigorous growth and to destroy at once any plants infected.

The parasitical diseases are also difficult to control, once they have been allowed to get a start, but various sprays are effective preventives. Within the last few years a great advance has been made in putting remedies into convenient forms for use by the small gardener, and also in making apparatus to apply them.

Own a Good Sprayer

Every gardener should have a compressed-air sprayer and a powder gun or bellows for dry dusting. There are a number of cheap blowers, but it will pay better to invest a dollar and get a substantial one, not only because it will last longer and do better work but also because it is essential to have a gun with which the under sides of the leaves can be reached.

Dusting with the powder forms of materials that have been used successfully for wet spraying, such as arsenate of lead, has been developed rapidly within the last few years. It is proving as efficient as the wet spray for many purposes, and is much more convenient to use in the small garden.

In addition to the sprayer and the blower take half an hour off some time and make the following apparatus for hand picking, which is still the quickest and most effective method of getting the best of some pests, such as mature squash bugs, rose bugs, aster beetles, potato beetles on eggplant, and so on: To a medium-sized tin can fasten a handle eighteen inches long at an angle of sixty degrees, so that the can may easily be held level. Fill the can with kerosene and water. Make a small paddle, pointed at the end, and with one flat edge.

With sprayer, blower and handpicker you will be prepared for anything in the way of an insect invasion that is likely to occur. Ammunition must be of several kinds, to meet the different methods of fighting adopted by the enemy.

Ammunition for Garden Pests

For chewing insects Paris green and arsenate of lead are the standard remedies. The latter has two distinct advantages—it stays on much longer, and can be used without the danger of burning the foliage that always accompanies use of Paris green. Arsenate of lead may be had in either paste or powder form. In comparing prices of different kinds check up the percentage of arsenic oxide each contains. The powder is equally as good as the paste for wet spraying, and in addition can be used for dusting. In the latter case it should be applied while the foliage is dry. Hellebore is not so effective as either Paris green or arsenate of lead, but it washes off readily and is therefore sometimes used on half-grown crops, such as currants and cabbage.

For sucking insects there are several good forms of insecticides, most of which have some form of nicotine as their chief ingredient. Usually the higher the percentage of nicotine the more economical the material, even though it costs more.

Tobacco dust is to some extent effective, but it is particularly useful as a preventive, not only of sucking insects but also of most of the chewing bugs, such as cucumber beetle, squash bug, and so on. If used freely on the leaves and about the plants before the bugs appear it acts as a repellent that is well worth the small cost of using it.

Kerosene emulsion, which may be either made at home or bought ready prepared in a stock solution to be diluted with water, is another standard remedy for sucking insects. It is perfectly safe and a good watering will remove all traces from the plant; for these reasons it is a good spray for plants near the house.

Plant diseases, so far as garden work is concerned, usually take one of three forms—blight, or yellowing and dying of the foliage; mildew; and anthracnose, or spotting and hardening of parts of the leaves, fruits or stalks. The standard remedy for fungous diseases of this sort has for

many years been Bordeaux mixture. This may be made at home, but for use on a small scale a good ready-prepared sort is more satisfactory. It can be had in the pure form or combined with arsenate of lead. This double mixture is effective against both diseases and chewing insects. A double-barrelled dry spray is to be had in powdered arsenate of lead and sulphur, which is convenient to apply to the vine crops.

A small amount each of arsenate of lead; Bordeaux mixture (or the two combined); tobacco dust; some nicotine spray, and kerosene emulsion will cost little but will furnish protection from all the troubles likely to be encountered. Most of these things will keep indefinitely. The important point is to have them on hand to use at once. As some of these things in their concentrated forms are deadly poisons, they should be kept out of the way of children. In using any of these things follow directions carefully. Different makes vary considerably in analysis.

Begin early in the season to use a combined Bordeaux-and-arsenate-of-lead spray on such vegetables and flowers as are likely to need it, and go over them at intervals of ten days or so to keep all new growth covered. In addition use tobacco dust freely wherever trouble from bugs or plant lice is anticipated.

Besides these precautions remember that everything you can do to keep your vegetables and flowers in vigorous, growing conditions will make them less likely to be attacked or to be seriously injured by the attacks of either insects or diseases.

June: First Week

VEGETABLES FOR FALL AND WINTER: SUCCESSION CROPS

The home vegetable garden should supply the table not only through the summer months, but also with a number of things for winter. As ordinarily managed it often not only fails to do this, but even does not supply many good things in the late fall. Careful planning and prompt action now are necessary to have a supply available from next September to May.

Among the vegetables that may be grown for winter are beets, Brussels sprouts, cabbages, carrots, cauliflower, celery, parsnips, potatoes, pumpkins, salsify, squash and turnips. Crops for the late fall garden are beans, cauliflower, corn, cucumbers, endive, lettuce, peas, radishes, and green tomatoes for pickling and ripening after frost.

The secret of success in achieving both table and keeping qualities of winter vegetables is to have them at the right stages of development when stored. The most common mistakes are too early planting and too small sowings to allow a surplus. To keep best and to taste best, vegetables should be matured but not fully developed. After reaching maturity vegetables undergo a ripening process that precedes decay. In the case of the root crops this is accompanied by toughening of the fibers, "stringiness" and general deterioration of table quality. Even small Hubbard squashes that have not ripened on the vine keep better than fully developed fruits.

Your crop for winter use should be planted with the idea of having the vegetables reach good table size by the date at which it is usually advisable to harvest for winter storage. This time will vary, of course, with local climatic conditions just as spring planting does; but remember that the later

the spring, the earlier fall and winter crops must be planted to have time to develop before freezing weather. The dates at which it is safe to plant various winter crops in the vicinity of New York are given in suggestions to follow. In the latitude of Philadelphia planting may be delayed a few days or a week; in that of Boston planting should be done a week or ten days earlier.

It is highly important to select varieties suitable for late sowings. An error in this respect is much more serious than in the case of spring sowings, as it may result in the loss of the entire crop. By using early and extra early varieties it is often possible to work in succession crops that would otherwise be impossible. In rich soil, and where irrigation can be applied, the time in which a crop can be brought through may be calculated almost to a day. Poor soil or dry weather at the time of sowing may delay things so that the crop will fail to come through on time.

Planting in Dry Weather

Success in sowing or transplanting in dry weather frequently hinges upon getting the soil pressed firmly round the seeds or plant roots. If a roller is available it may be used in addition to the roller wheel of the seed drill; or before covering, a wheelbarrow lightly loaded may be run over the rows of seeds, like peas and beans, that are planted by hand. If the weather is so dry that water must be used in transplanting apply it in the holes before setting the plants.

A number of plants, especially those of the cabbage group, are sown early and transplanted. Success with these depends to a great extent upon getting strong, healthy, stocky plants to set out. Sow the seed thinly in rows twelve to fifteen inches apart, or better in hills four to six inches apart. As soon as the seedlings get their second or third leaves thin out so that only one plant stands in a place. Plants so grown will by transplanting time have stems thicker than a lead pencil. As the flea beetle frequently

injures seedlings severely, keep them dusted with land plaster or tobacco dust until they are well started.

A package of each of the seeds will give plants enough for the medium-sized home garden. To insure good germination, if the ground is very dry, mark off shallow trenches and run the hose along each one, refilling it, as the water soaks away, several times. Do this some hours before planting. Information about the winter's vegetables follows:

BEETS. When July is likely to be hot and dry it is best to sow in June. In light soil, plant an inch or an inch and a half deep. Detroit Dark Red and Crimson Globe are good sorts for storing. Extra-early sorts may be planted later.

BRUSSELS SPROUTS. These are particularly fine for late fall and winter, as severe freezing only improves their quality. Sow in late May or early June, and handle in the same way as cabbage. Cutting out the crowns of the plants after the sprouts have formed throws strength into the development of the heads. Dalkeith and Danish Prize are good varieties.

CABBAGE. Sow from the last of May to the first of July, according to the local season and the variety. Danish Ballhead is of medium size, of excellent quality and one of the best keepers. Some of the round, hard-heading, early sorts, such as Glory of Enkhuizen and Volga, may be grown in a shorter season than the standard late sorts and are of more convenient size and of better table quality. The Savoy type is unexcelled for flavor. In favorable seasons practically every seed will germinate, so be careful not to sow too thickly.

CARROTS. In good deep soils a good strain of Danvers Half Long is unsurpassed. In shallow soil a shorter type, such as Chantenay, will prove more satisfactory. To be sure to get the crop of good size these should be sown in Northern sections during June or early July. Early varieties may be sown later. Thin out early whether you have a surplus for the table or not, as small ones will not have a chance to mature as they do from the early sowings.

CELERY. Plants for the early fall crop may be set out

now. Those for winter should be set late in June or in July. As the rows are a good distance apart fertilizer or manure may be used to advantage in the drill. This should be mixed thoroughly with the soil and applied preferably some time before the plants are set. Soak the trenches thoroughly before planting if the soil is at all dry. If the weather is hot and bright shade the plants with wide boards for some days. Keep well cultivated from the start.

PARSNIPS. If these are planted now they will be of better table quality than those planted in spring, as overgrown roots develop undesirable pithy cores. When there are a few rows more than you will want to take up for winter, leave them in the ground for spring use.

POTATOES. Even in the more northerly sections potatoes for winter use can be planted as late as the Fourth of July, if soil conditions are favorable, with the probability that they will make a good crop before killing frost. Even if the skins have not become hardened when dug these potatoes will keep excellently and will be particularly good for seed for next year's garden.

PUMPKINS. A few sugar pumpkins are always acceptable for pies at Thanksgiving and during the first part of winter. Sow them now in prepared hills between the corn rows. They will make a good start, and later when the corn is cut off they will have full sunlight. Spray the young plants to protect them from squash bugs and black cucumber beetles.

SALSIFY. This is one of most delicious of vegetables available for winter use and a good supply must be sown. The soil must be deep and rich to grow good smooth roots. On account of the peculiar shape of the seeds it is difficult to sow evenly with the drill. The small amount required for the home garden may easily be sown by hand, four or five seeds to the inch. Thin to three inches after the plants are well up.

SQUASH. When space is limited squash may be planted between the corn rows, or a few hills may be placed at the edge of the garden, so the vines can run out on the grass.

In a very small garden plant *Delicata* or *Fordhook*, either of which is excellent for summer use and also keeps well through the winter. *Fordhook* may also be had in bush form. *Hubbard* and *Boston Marrow* are two of the standard winter varieties and *Delicious*, a newer one, is of superfine flavor. Like the pumpkins, early growth must be carefully guarded from bugs. A few bottomless boxes covered with mosquito netting will do this.



TURNIPS. The long varieties, of the *rutabaga* type, of which there are some new varieties excellent for table use, should be planted during June. The round yellow and white sorts, such as *White Egg* and *Amber Globe*, should not be planted until July or even the first of August, if the season is long, as they develop very quickly and are likely to become overgrown.

Succession Crops for the Fall Garden

The vegetables which by successive sowings may be had in fine quality up to killing frost include the following:

BEANS. Pole varieties such as *Golden Cluster* and *Old Homestead*, and the *Limas*, of which *Early Leviathan* and *Giant Podded Pole* are two of the best, should, if planted now, give a continuous supply during the late summer and fall. If the bush varieties are preferred make a small planting every two to three weeks of some of the good wax sorts, such as *Brittle Wax*, *Rustproof Golden Wax*, or *New Kidney Wax*. Any surplus of either the pole beans or these may be kept over in the dried state for winter use. Leave only two or three of the pole beans in each hill. Thin the dwarf sorts so that each individual plant has plenty of room to develop.

CAULIFLOWER. To have a supply throughout the fall, it is best to make two separate plantings, one in early June and one toward the end of the month. *Snowball* and *Dry Weather* are both excellent sorts, the latter requiring a little

longer to mature. To do well, cauliflower requires an abundance of moisture and the plants should be set where they can be watered while the heads are forming.

SWEET CORN. This may be planted until the Fourth of July, or later if an early sort is used. An elevation of twenty-five to fifty feet will often carry it safely through the first frost, which is frequently followed by several weeks of good growing weather. Corn may be sown in drills and the plants thinned to ten to twelve inches apart as soon as well started.

CUCUMBERS. It often happens that late in the fall the first planting is used up except for a few yellow and over-ripe ones that are useless for pickles and salad. Sow a few hills late in June or early in July. Keep the plants well covered with tobacco dust or ashes or land plaster during early growth.

KOHL-RABI. If you are fond of this vegetable make a sowing in early June, and another in July for a late supply. They should be used before the outer skin becomes hard and while the bulbs are quite small—not more than three inches in diameter.

LETTUCE. During midsummer heat-resisting sorts such as Salamander, Brittle Ice, Deacon and New York should be used; although, if irrigation is available, Grand Rapids, Big Boston and other spring varieties may be grown successfully. When conditions for germination are adverse success may often be had by shading the lettuce patch until the plants are well up. Seed sown in dry soil is almost sure to be a failure, but by watering the ground before sowing and by shading, a stand can generally be obtained.

PEAS. For summer planting use the heaviest soil available and get the seed well down into the ground—two to two and a half inches will not be too much. Partially sprouting the seed before sowing will help in dry weather. For the latest sowing, which can be made up until August, use early varieties, such as Gradus or Little Marvel. Use kerosene emulsion or some nicotine spray to control plant lice.

RADISHES. The spring sorts are usually of poor quality during summer and better results will generally be had with some of the larger summer sorts, such as Chartier, Crimson Giant, or White Strasburg. For winter radishes, to keep over in sand, White Chinese, China Rose and California White Winter are good. They should not be sown until late July.

TOMATOES. Like cucumbers, tomatoes sometimes "run out" before the end of the season. Plant a dozen or two plants in late June or July, from seed sown now, and they will mature fruits before frost to furnish a supply of green tomatoes for pickles. The largest and finest fruits should be saved for ripening in a cold-frame or in straw in a dark room or cellar, so that ripe tomatoes can be had for a month or more after the outside crop is gone.

June: Second Week

FIGHTING DRY WEATHER: MULCHING; WATERING; MODERN IRRIGATION

Drought is only the acute form of a chronic summer garden disease—lack of soil moisture. Dry weather is the most insidious and the most effective enemy of big crops. Potato bugs may cut down your crop of potatoes; possibly squash borers will get all your squashes; but dry weather attacks every vegetable in the garden and cuts down the yield of every one.

Lack of moisture prevents maximum crops more often than lack of plant food. Experiments have shown that a fifty per cent saturation of the soil is ideal for growth. During June, July, August, and often September, probably not one garden in a hundred is, under natural conditions, saturated to that degree a quarter of the time. Therefore the intelligent gardener will endeavor during the summer months to keep up to the highest possible point the amount of moisture in his garden soil.

Only two treatments are possible in fighting dry soil. The first, except in seasons of more than normal rainfall, can be only partially successful in the great majority of gardens. It is to handle the soil in such a way that every drop of water is conserved and utilized as efficiently as possible. The second treatment is to *add* water by artificial means. Thanks to the development of overhead irrigation during the past few years, it is now possible for the small gardener, no matter where his garden may be situated, to apply water copiously and with very little effort to his growing crops, provided only he has the water available for use.

The first essential in conserving such moisture as Nature does supply is frequent cultivation, with that particular

aim in view. By the time the dry weather sets in the weeds should be pretty well under control; from then on, cultivation to conserve soil moisture by creating a dust mulch accomplishes the further work of destroying, practically before they get a start, such additional weeds as may sprout, and of keeping the earth loose and open so that the air can penetrate readily—another condition essential to healthy plant growth. The cultivator should leave the soil finely pulverized and level. For most crops it should cut not more than an inch or two deep. Therefore a flat blade, or a gang of broad, flat teeth, should be used in preference to the regular narrow cultivator teeth, which are valuable early in the season, or which may be necessary if the ground has been tramped down. Aim to keep the inch or two of soil on the surface as fine and dry as dust. It is a good plan to try to get over all the garden once every week. Use the wheel hoe, working round the plants with the hand or a small hoe as may be necessary.

Mulch to Hold Moisture

For some of the vegetable crops, some of the small fruits and many of the flowers, mulching with other material is effective. Light, strawy manure that will not work into the soil satisfactorily may be used in this way. Such plant food as it contains will be washed into the soil and made use of by the hungry plant roots, and the bulky part of it, forming a thick mat over the soil, will readily admit rain or water from above and hold it. Under such a cover the surface of the soil itself decomposes and crumbles, releasing the locked-up plant food, and forming an ideal condition for strong plant growth.

A few vegetables that particularly require moisture and are benefited by such mulching are eggplants, cauliflower, celery, potatoes and tomatoes. Currants and gooseberries appreciate summer mulching. Roses and sweet peas are greatly benefited. Although light manure is probably the best material, other things, such as grass

clippings, old leaves, straw, old winter mulching, and so forth, can be utilized to great advantage for the same purpose.

The Gentle Art of Watering

The simplest and most commonly used form of irrigation is by means of a hose. But a hose outfit costs almost as much as one for overhead irrigation, needs to be replaced every few years, and requires a great deal of labor. By overhead irrigation the water is applied automatically, except for a few moments' work in turning the pipe every half hour or hour. The outfit, consisting of galvanized pipe and brass or nickel nozzles instead of rubber hose, will last a generation.

As a hose is more universally used, however, some suggestions for applying water by this means may be given. It is possible to do more harm than good by watering. If you are going to water a crop at all you should do it thoroughly. A slight sprinkling on the surface, even if it is given daily, is of little use, because it stimulates the growth of roots near the top of the soil, where they are most exposed to the effects of heat and dry weather. A thorough soaking once a week is much more effective than seven sprinklings.

Water may be applied just to the soil or over the foliage. In the former case the quickest and best way is to open up a shallow furrow along the edge of the row and to turn one end of the hose into it, letting the water run until the ground is thoroughly saturated, and then throwing the earth back. This saves labor and gets the water down to the roots. But cover up afterward with pulverized soil, for if the water is allowed to run on the surface the ground will cake, both wasting water and getting the soil into bad condition. When the water is applied over the plants and the foliage it should be broken into as fine a spray as possible. A simple, twisted-wire support, which may be purchased for a quarter, will hold the nozzle in any position, and this will save much time in watering. If the pressure is sufficient the ordinary

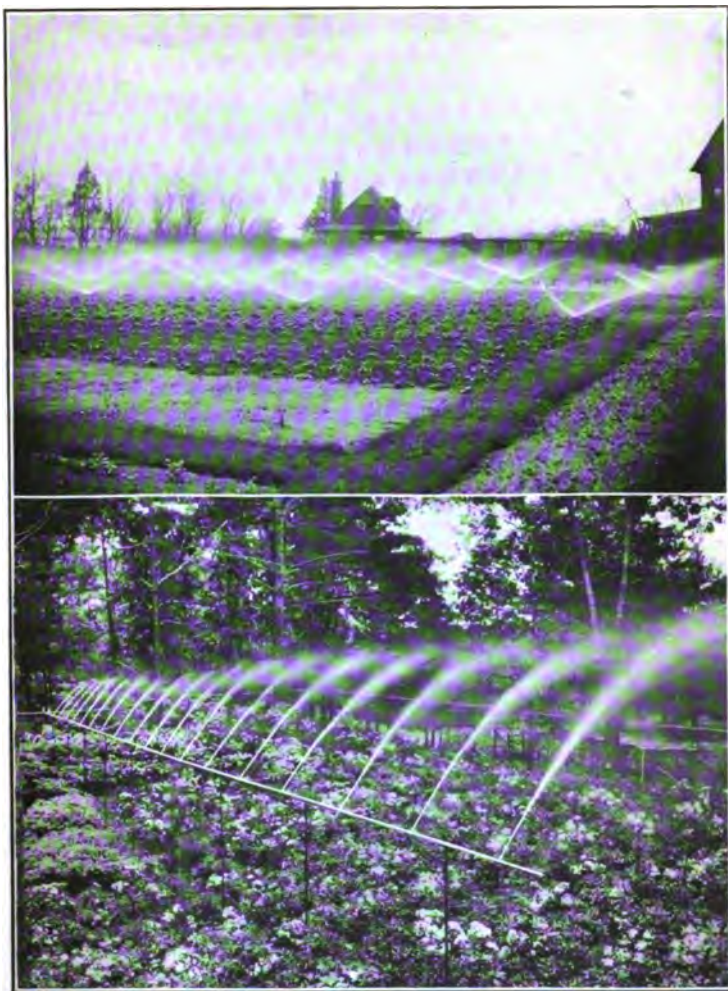


PLATE 13.—Modern spray irrigation solves the problem of moisture control for both vegetable and flower gardens. The upper illustration shows a typical circular spray system at work on a vegetable bed. The lower, a nozzle line system over flowers. In either the gardener can have rain whenever he wants it.



PLATE 14.—(Left) Modern irrigation can be used almost anywhere about the grounds to keep them green and flourishing throughout the summer. When the water is turned off, a line arranged like that in this picture is almost invisible. (Right) This shows the valve by which the water is turned on and off and the special fitting with the strainer and handle by which the line is revolved from one side to the other, adjusting the spray to any position desired over a plot forty to fifty feet wide and as long as the line of pipe. Where wanted, an automatic turning device takes the place of the turning handle.

types of lawn sprinklers may be used, but they must be watched carefully and shifted frequently.

In watering flower beds, which are generally rounded up toward the center, be careful that most of the water does not run down to the outer edge. Shallow furrows between the rows of plants will hold the water until it can sink into the soil. If your lawn is too big to cover at each watering establish a system so that the various parts will be thoroughly watered in turn. Here again a thorough soaking once a week is better than a daily sprinkling.

The best time to water is late afternoon. Either wind or sunshine will waste a good deal of water through rapid evaporation. Whenever possible, cultivate the ground soon after watering to reestablish the soil mulch. Individual plants that you are trying to nurse along, or flowers to be grown for exhibition, may be given special attention by sinking a large flower pot near each, with the hole at the bottom loosely corked. Filling this pot every day or two will keep the plant supplied.

Modern Irrigation for the Garden

The nozzle-line system of overhead irrigation may be installed either on neat posts of inch gas pipe painted green or white, or hidden along a fence, on top of a pergola, or along the edge of a walk or curbing. It will work well from a considerable height or within a few inches of the ground, provided there are no tall plants near to interfere with the streams as they leave the nozzles. A small, portable, nozzle-line watering outfit is now made with a water motor attached, and mounted on wheels, so it may be moved readily from one part of the grounds to another and set up with a few moments' work. It turns automatically and requires no attention except to turn the water off.

Modern irrigation sprinklers cover a circle some thirty to fifty feet in diameter, and make a very efficient portable watering device. For larger areas, the sprinklers are placed on upright pipes or "risers" at regular intervals,

so that the whole space to be irrigated is watered at one time.

For the vegetable garden, at least one nozzle line the length of the plot should be fitted up. As the nozzles throw twenty-five feet in either direction, the pipe being turned from side to side, this line will cover a strip fifty feet wide. If the garden is wider than this another line may be added or the first one may be built in sections of convenient length to move. A twenty-foot length of three-quarter-inch pipe weighs only about twenty-five pounds.

At the head of each line of nozzles there should be a gate valve to control the water, and a turning union. The older types of nozzles were somewhat given to clogging up, but in the newer ones this difficulty has been largely overcome.

The various items required for a line of the nozzle system are: Gate valve, seventy-five cents; turning union and handle, \$1.75 to \$3, according to type and finish; nozzles, inserted every three or four feet in the pipe, five cents apiece; and three-quarter-inch galvanized pipe, six to eight cents a foot. To get your nozzles in perfect alignment along the pipe you need a special drill fitted with a level with which holes are drilled after the pipe is in place. For a few hundred feet of pipe for a garden you can have the holes drilled and the nozzles inserted where you buy the pipe.

The two great advantages of watering with overhead irrigation are the tremendous saving in time and the fact that the water is applied in an ideal way, falling in small drops that do not pack the soil or spatter or injure foliage or blossoms.

June: Third Week

SUMMER WORK IN THE ROSE GARDEN: INSECTS; DISEASES; SUMMER PRUNING; KEEPING CUT FLOWERS FRESH

Continued attention is necessary in the rose garden if you would make sure of an abundance of perfect blossoms. No matter how strong and healthy the plants may look, and even though the first buds may have opened, serious injury still threatens from a number of sources. Protection from insects and diseases, summer mulching, extra manuring, summer pruning, training new growth, and so forth, are among the things that the rose grower must keep in mind and give attention to throughout the season.

The rose is liable to injury from many insects and diseases. The most annoying and pernicious intruders are the rose bugs or rose beetles. These insects are particularly hard to combat because they generally appear when mature and ready to do the maximum amount of injury with a minimum susceptibility to insecticides. If neglected they will entirely defoliate even large plants. The first attacks, however, are usually confined to open flowers and buds, particularly of light-colored varieties. The beetles are most prevalent in sections where the soil is sandy, but as they can travel long distances, and make themselves at home on wild roses as well as on the cultivated sorts, few localities seem to be immune from their attack.

Paris green, one pound to 150 to 200 gallons of water, and arsenate of lead, five pounds to fifty to seventy-five gallons of water, are effective poisons; but Paris green is likely to injure the foliage, and arsenate leaves it discolored. Unless the beetles attack in overwhelming numbers, by far the quickest, surest and least injurious method of

getting rid of them is "hand picking." This should be done early every morning, and with the proper equipment a great number of beetles can be destroyed in a very short time. An old cooking vessel with a handle, such as the bottom part of a double boiler, is just the thing to collect bugs in. It should be filled about a third full of water and kerosene. From a piece of shingle whittle out a pointed paddle, which may be used to dislodge the beetles. If this work is done regularly every morning when the beetles first put in an appearance you will not have much difficulty in getting the best of them.

The rose slug is often troublesome. This is a small green worm that works on the under sides of the leaves, eating through and leaving only skeletons. Birds generally keep the slugs under control, but if they get numerous enough to prove injurious, hellebore, either dusted or sprayed, will get them. Be sure that the under sides of the leaves are covered. Hellebore may be dusted on pure, or mixed with boiling water, a tablespoonful to two gallons, and used when cool. Arsenate of lead powder is also effective and may be dusted on the under sides of the leaves with a goose-necked duster. The slug usually appears from June to August.

The green fly or aphid frequently attacks the rose. Being near the color of the plant this may become firmly established before being noticed, unless sharp watch is kept. The flies usually congregate first about the base of the bud, in leaf axils, or in any place where they are likely to pass unnoticed. When you discover them spray at once with nicotine or kerosene emulsion. Keeping the plants dusted with tobacco dust will help to keep the aphides away. If they become established the plants will need to be sprayed several times; the pests propagate so rapidly that a few will soon reinfest the plant.

Another insect that sometimes attacks roses, working from the under side of the leaves, is the leaf hopper. Small yellow spots appear on the upper surfaces of otherwise healthy leaves without apparent cause. The hoppers are

very small and are something like flea beetles in their habit of jumping away when disturbed. They are light yellow in color. Nicotine spray and kerosene emulsion are effective against them.

Mildew, Anthracnose and Leaf Blight

The disease most commonly attacking roses is mildew. There are two forms: The first and most common is conspicuous because of the suddenness with which it appears, forming a cobwebby coating upon the leaves. The standard remedy is flowers of sulphur, mixed with a little slaked lime if desired, which may be dusted on where the disease appears. The second form, downy mildew, is more persistent, as it works farther into the tissues of the plant. Flowers of sulphur, or other fungicidal sprays, will prevent its spread, but all infected leaves should be carefully gathered and destroyed.

When the leaves on apparently healthy plants show small black spots, fade out and drop off, so that the plant looks very much denuded, anthracnose is likely to be the trouble. It may be controlled by spraying with ammoniacal-copper-carbonate solution at intervals of a week. All affected foliage should be burned.

Somewhat similar to anthracnose is leaf blight, which resembles strawberry blight. Bordeaux is useful in controlling it. If the foliage turns a faded color and falls, especially from new growth and from the tips of canes, the disease is leaf blight. Infected canes should be cut out and burned, and if there are many bad places it will be best to get rid of the entire plant.

All this makes quite a formidable array of troubles, but the rose grower is not likely to encounter them all during one season. Most of them can be controlled by a single combination spray applied every ten days or two weeks throughout the season. This plan of protection is by far the safest and surest in the end, particularly when the roses are grown mostly for cut blooms and a slight disfigurement

of the foliage will not be a serious objection. When it is desired to keep the foliage clean, ammoniacal-copper-carbonate may be used in place of Bordeaux and arsenate of lead powder instead of paste.

It is of great advantage to have available an abundance of water under strong pressure. Water applied in a fine spray will not injure the roses and will keep in check most of the insects to be feared.

Summer Mulching and Pruning

To bloom through a long season and with vigor roses require plenty of mulching. Summer mulching is of great advantage. Fine, rather light, well-rotted manure is ideal for this purpose. If it is too fresh it may injure the plants; if too coarse it is not effective as a mulch. The bed should be thoroughly hoed over before the mulch is applied, so sprouting weeds will be destroyed. To obtain the best blooms some additional feeding of the plants will be required; the mulch of manure, if of the right kind, will serve this additional purpose, as every rain or thorough watering will carry plant food down to the roots.

When mulch is not used liquid manures or bone dust or bone flour and a little nitrate of soda should be given. If the ground has been thoroughly enriched an application of nitrate of soda alone will generally show marked results. Another convenient form in which this additional plant food may be applied is by giving a dressing of sheep manure or shredded cattle manure, raking or hoeing it lightly into the surface, and then giving a thorough watering. This is much more convenient than making and applying liquid manure and it gives much the same effect.

When many flowers are cut the plant is practically given a summer pruning in their removal. In cutting flowers, as in pruning, be sure always to cut about a quarter of an inch above an outside bud or branch, so the bush will tend to grow outward, leaving an open center to admit plenty of air and sunshine.

A moderate pruning or cutting back, as the blooming season draws to a close, will increase the number of flowers to be expected at the next blooming period. Even the hybrid perpetuals sometimes give a few blossoms again in the fall.

Training Climbing Roses

The Crimson Ramblers and other climbers are given their annual pruning just after blooming. Cut out the oldest flowering wood or any old, dead wood that may have escaped notice in the spring, and such new growths as cross or conflict or seem not to be needed. There is little danger of taking out too much, as the new shoots grow from ten to twenty feet or more during the season.

Begin training the shoots while they are small. Do not fail to provide a suitable trellis. The climbing roses, if simply fastened up against the house, will work havoc with eave troughs and the edges of the roof over which they climb, keeping them shaded and wet and inviting rot.

In the cases of some of the taller bush roses, which tend to send up straight, tall canes, bend over the new pliable canes a couple of inches or so above ground, nearly at right angles, and bend upward again a few inches farther along the cane. These crooks check the flow of sap, with the result that the buds on the lower parts of the canes are allowed to develop; otherwise you are likely to get many canes that are practically bare of foliage near the bottom.

Keeping Cut Flowers Fresh

Double enjoyment is to be had from the garden throughout the summer by the judicious use of cut flowers. Many people refrain from the free use of blossoms indoors for fear of curtailing the supply outside. Free cutting, however, almost always means more flowers. The plants upon which the blooms are allowed to mature will go by much sooner than if the blooms are kept cut. This is especially true of annuals, such as sweet peas. Even if you cannot

use them all, the blossoms should be removed as soon as they begin to fade.

Make a practice of cutting your flowers daily, early in the morning. Those designed for use in the house should be cut just as they are beginning to open. Do not, however, make the mistake of feeling that you must use all the flowers you cut. A massive, crowded, mixed bouquet, containing all kinds of flowers and colors, is not a thing of beauty.

The Japanese, who have made a distinct art of arranging cut flowers, generally use only two or three blooms of a single variety. Perhaps, according to our taste, this is extreme; but there is a happy medium. The mixed bouquet should be so arranged that it appears natural.

To keep flowers fresh until they are put into the water after cutting, sprinkle them, wrap the stems in moist paper or a damp cloth, and keep in a tight box in as cold a place as possible. To keep them fresh in the vases cut off a little of the stems daily, and supply with fresh water. To revive wilted flowers, cut the stems, place for ten minutes in water as hot as the hand can bear it, and then in cold water. Freshly cut flowers will keep better if they are placed in fresh cold water, or the stems in a damp cloth, and kept in a cold place, before being used for bouquets or in vases in the living room.

June: Fourth Week

CELERY FOR FALL AND WINTER: BUYING PLANTS; TRANSPLANTING; CULTURE; EARLY BLANCHING

Celery takes up little room in proportion to the yield and can follow an earlier crop that has been removed. From the middle of July to the first of August put in plants designed for fall and winter use, as the first fall frosts do not check growth. Plants set out earlier will be ready sooner in the fall, but quality is always poor until cool weather, which adds the crispness and tang that makes celery a winter favorite.

Make the soil for your celery patch the richest spot in the garden. The more rapid and luxuriant the growth the better will be the quality and the more certain the crop will be to come through on time. Here is a chance to use up all the season's left-overs in the way of plant foods. There are probably odds and ends of fertilizers, the compost heap that has accumulated during the spring and summer, the chicken manure, and some ashes. In addition to this general hash of plant foods, give a good dressing of high-grade fertilizer for the last course, and rake it thoroughly into the soil.

Do not be afraid of getting the soil too rich. Any of these deposits in the soil bank that the celery does not draw upon for use will be available for early spring crops of green onions, lettuce and cabbage.

Equally important are good, sturdy, well-developed plants that have already begun to get their shape, are easy to plant, and are ready to grow right on. Size at the base of the stalks, rather than height, should be the basis upon which to judge plants. A spindling plant will waste a good

deal of time in readjusting itself to a better form, if it ever does so.

If you have your own plants growing in a flat or in a frame cut the tops back severely a week or so before planting. It is well, also, to keep them rather on the dry side until just a day or two before planting; this stimulates the growth of the feeding root hairs which take up the plant-food solutions from the soil, and, as many of these roots are destroyed in transplanting, even with care, the more there are available the sooner the plants will become established.

If you have to buy plants select them personally in your own neighborhood if possible. If they must be ordered from a distance secure plants that have been transplanted or are "re-rooted." Celery for the summer planting is often sown late in March or early in April in the open and grown without transplanting; if these are thinned out and properly cared for they will make handsome-looking plants, but each will have formed one large tap-root, instead of the desired thick mat of fibrous roots.

The "re-rooted" plants have had the main root cut, with the result that a fibrous mat of roots, similar to that of a transplanted plant, has been formed. This has, of course, made an extra operation and such plants cost a little more.

Water Needed at Transplanting

Celery suffers more quickly from lack of water than most other plants at all stages of development. Moreover, the setting out is usually done at the driest season of the year. At the time of transplanting it is often advisable, even when it is not absolutely necessary, to use water.

Prepare the ground in advance for transplanting. The rows may be from two to four feet apart, depending upon the method to be used to blanch them and the variety. Frequently celery plants are set out between rows of other things that are still growing but will be out of the way before the celery needs all the space. With some modern methods of blanching, to be described later, the rows may be, if nec-

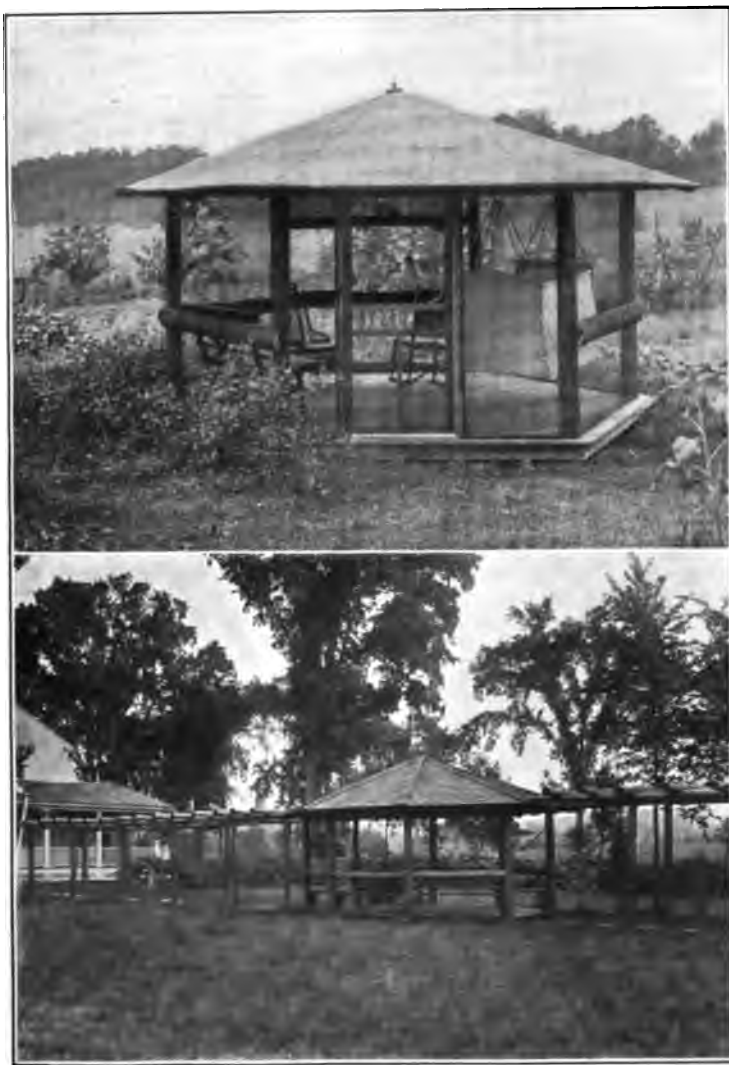


PLATE 15.—A little home made house like this will be used almost every day during the summer and autumn. See text for list of materials required. In the lower photograph, a pergola extends from the house to the summer house and is continued on to the garage. Covered with vines, it affords a passage protected from sun and from ordinary rain storms.

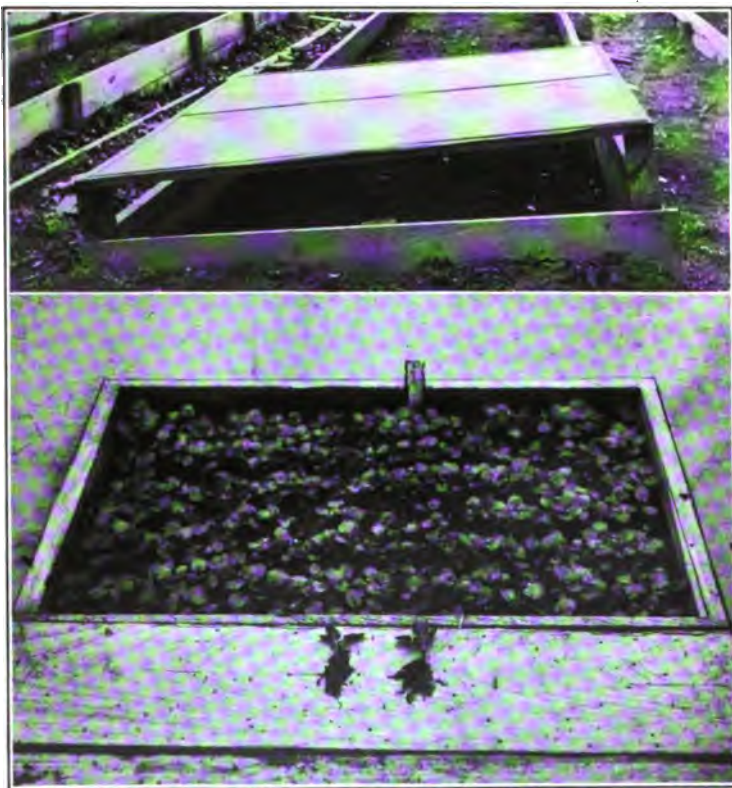


PLATE 16.—The starting of pansies and other hardy perennials and biennials for next season's bloom is one of the important tasks to be attended to through July and August. The cloth covered sash which can be held in place a few inches above a cold frame makes an ideal place in which to start the seeds. Cool and shaded but with plenty of air. (*Lower*) A box of pansy seedlings ready to be transplanted to their winter quarters. The little plants have developed four or five true leaves and a good bunch of roots. In starting plants of this it is important not to get the seeds too thick. The plants are allowed to make more development before being transplanted than those started in spring under glass.

essary, as close as eighteen inches. Or the plants may be set eight to twelve inches apart each way, so that they will crowd enough to grow upright and blanch themselves. When space is very limited, this method may be used to advantage; but the stalks of the individual plants do not get so large, and, in order for this system to be successful, the soil must be enriched to the limit and an abundance of water applied every few days. Another method is to plant in double rows, six inches apart, so two rows may be planted together. This is advisable when blanching is to be done by hilling with earth. With boards or individual blanchers it is of little advantage, except that more plants can be grown in a limited space. The plants are set about six inches apart in the rows.

After the soil is ready, if water is to be used, open up a shallow trench the length of each row with the wheel hoe and turn in the water until it is well filled. If necessary fill it several times, until the soil at the bottom is well saturated. If this can be done in the morning conditions will be right for planting in the late afternoon. If not enough water is available to flood a trench in this way dig small holes with the hoe or trowel where the plants are to be set and pour half a pint or more of water into each.

Watering on the surface after setting the plants, unless it can be done with an irrigating outfit that will soak the ground thoroughly, is of little use.

Shading the plants from the hot sun, however, keeps them from wilting. A wide board set on edge at an angle on the sunny side of the row, and held in place by short stakes, is a quick and effective method of supplying shade. When only a few plants are set newspapers may be arched over the rows and held in place with soil. If the weather remains bright and hot the protection may be left on for several days after planting; the plants will get enough light and air without removal at night.

Trim the Roots

As the celery plants are received, or as they are lifted from the seed bed or flat, the roots are too long and should be well trimmed before setting. Do not be afraid of injuring the plants by this root pruning. Long roots that can easily be bent or broken are either dead or so much injured that they are of no use to the plants. The trimmed roots are not only easier to handle, but they also induce the formation of small side roots that help to establish the plants quickly in their new quarters. Trimming back the top saves work in planting and lessens the loss of water to the plant through transpiration—so that the curtailed root system is able to keep up with the demands of the plant, and wilting is reduced.

In buying plants, strain as well as variety is important. Celery seed, even of the same variety, differs greatly in its ability to produce solid, meaty stalks. The hollow hearts, which celery growers try to avoid, are usually the result of inferior seed. As to varieties, White Plume gives the earliest results and is the easiest to plant. It is not so large nor so crisp and nutty in flavor as some of the later sorts. Golden Self-Blanching is a universal favorite. It blanches readily, though not so easily as White Plume. The stalks are thicker and stockier. Winter Queen and Evans' Triumph, which are similar, are of medium size and form thick, stocky stalks; they are more easily blanched and handled than the old, tall-growing varieties. Emperor and Easy Blanching both make thick and meaty stalks and will undoubtedly become widely used, especially in private gardens, as they become better known. If there is room to grow but one variety Golden Self-Blanching will be found satisfactory. If two can be used try White Plume or Golden Self-Blanching for early use, and Winter Queen or one of the other new sorts for fall and winter.

After planting, celery will require little care for several weeks except to keep it thoroughly cultivated and growing

rapidly, with one or two light dressings of nitrate of soda to speed it up. As the plants get taller, a little earth should be worked toward the rows with the horse hoe or wheel hoe. Then the important work of blanching begins.

The first step is to maintain the plants in an upright position of growth. This can be done by working the earth round the plants with one hand while holding the stalks together with the other. No attempt is made in this operation to cover the stalks; the purpose is merely to keep the outside leaves from spreading out flat, as they would do if left to themselves, so that when the blanching is undertaken it will be easier, and the bunches of stalks, being compact, will keep the soil from getting into the heart of the plants.

Blanching for Early Use

In the home garden, up to the time of storing celery for winter only a few plants will be wanted at a time, and the easiest and best method of blanching is by using a metal collar with paper bands made for the purpose. The metal collar is clamped about the plant, holding the stalks together, the paper tube is slipped over it, and the metal piece is drawn out, leaving the plant neatly held in a tight paper casing. A dozen or two stalks can be quickly blanched at a time by this method. The paper tubes, which cost about a cent and a half apiece, will last, with care, for several seasons. Short pieces of drain tile may be used in the same way, but they are much harder to put on, clumsy to store and will not give so satisfactory results.

For blanching with earth, which seems to give a little more crispness and flavor than any of the other methods, the soil should be thoroughly loosened up between the rows and worked up to the plants as high as possible with the cultivator or hoe. Then it must be drawn up or banked up with the spade so that the stalks are covered clear to the top leaves, excluding all light. This should be done only when the plants are dry, though the soil banks much better when it is fairly moist. Only that part of the crop which is

wanted for the late fall or early winter use should be hilled up or blanched in this way. That designed for winter use should be left growing in the green state, to be trenched or stored in the cellar or frame or root pit after the other garden vegetables are harvested.

Celery in the home garden is generally quite free from insects and diseases. The celery caterpillar and rust or blight are the only things likely to give trouble. The former is a conspicuous caterpillar, two or three inches long and similar in appearance to the caterpillar which feeds upon carrots. Usually these do not appear in large numbers and hand picking is the easiest way to get rid of them. For protection from rust or blight, the plants should be sprayed before the disease appears. Bordeaux will do, but will disfigure the foliage to some extent, so ammoniacal copper carbonate solution is preferable. Spray every ten days or so. Avoid working round or handling the plants while the foliage is wet.

July: First Week

MIDSUMMER WORK IN THE VEGETABLE GARDEN: SAVING THE SOIL MOISTURE; EGG-PLANTS AND PEPPERS; THE VINE CROPS, TRANSPLANTING IN DRY WEATHER; LATE PLANTING

Scores of gardeners who started out enthusiastically in spring begin to let up a little when hot weather comes in June, and practically abandon the garden to its fate after the Fourth, sacrificing a large part of the work already done.

The root crops for late summer and for winter should be top dressed now with nitrate of soda. This is particularly valuable in dry weather, when nitrogen in the form generally existing in the soil is largely inert because there is not enough moisture to make it available.

One of the most important factors in securing good root crops is to thin out sufficiently and to do it early. Two to three inches apart is right for carrots, onions and salsify, three to four inches for beets, parsnips and the smaller varieties of turnips; and four to six inches for large turnips and rutabagas.

The various hot-weather plants will need attention now—tomatoes, peppers, eggplants, muskmelons, watermelons, pole beans, lima beans and late sweet corn. All these, with the exception of dwarf limas, are usually grown in hills, and it is a temptation to cultivate and weed just round the hills and to let the spaces between go until the plants get considerably larger.

This is a great mistake. An efficient way of managing these crops in the home garden is to use the rake attachment on the wheel hoe and an ordinary iron rake between

the hills. An hour's work with this combination before the weeds start, and once a week thereafter, will take care of a surprisingly large number of hills. If, however, the weeds are allowed to establish themselves, as they do very quickly at this time of the year, the rake teeth will not destroy them and the hand hoe must be used.

Supports for Tomatoes

When only a dozen or two plants are grown, staking and pruning of tomatoes are always advisable. Plants thus cared for occupy less room, produce earlier and more first-quality table fruit, even if not a greater total amount, the fruit ripens earlier, and is much less subject to the attacks of rot or other disease.

Drive in stakes five or six feet long soon after the plants are set out and tie the vines before they have made growth enough to lop over. Some gardeners prefer pruning to single stems, but usually more and practically as good and as early fruit can be had by allowing one or two of the suckers or side shoots on the plants to grow.

When the plants are set out in one or two long rows a convenient and easy method of supporting them is to put in a few stout stakes, and stretch two pieces of wire on these, one six inches or so above the ground and another four feet above the first.

Twine is strung between the wires, and upon this the vines are trained. Barrel hoops, supported by two or three stakes, also make a good support, particularly if the vines are not to be carefully pruned.

Look out for the large horn or tomato worm, which if left unmolested will do a great deal of harm in a few days. He is a chewer and arsenate of lead will get him, but the quickest and best way is hand picking. Keep the plants well supported and thinned, removing surplus foliage to admit sunshine and air, thinning fruits that touch, and spraying with Bordeaux; this will prevent rotting.

For a supply of tomatoes for canning and preserving and

an after-frost supply to be kept in the cold-frame or cellar, late plants should be set out. One way of obtaining a crop of these is to root a batch of cuttings now. Side shoots that are removed and placed in a box of sandy soil in the shade and kept watered will root in a few days, and these made-to-order plants may be brought to full bearing before frost.

Eggplant should be given a dressing of nitrate of soda at the first hoeing, and a dressing of liquid manure or a complete fertilizer at the second. An abundance of moisture is necessary, and if irrigation is not available a good plan is to mulch the rows with short strawy manure, rotted leaves or old short straw.

Don't Leave Vine Plants to Strangle Each Other

The various vine crops are treated in much the same way. Probably the most common mistake is in leaving too many vines in a hill. The gardener who has succeeded in getting a stand of six or eight good plants feels that he has done his duty when he pulls out all but four or five. Reduce this number to two as soon as they begin to crowd. Use tobacco dust as a preventive of striped cucumber beetle. Spray with Bordeaux mixture or dust with an arsenate-sulphur compound to keep all the new growth covered. For the large black stink-bug use kerosene emulsion. Watch squash and pumpkin vines for the borer. When the tips of the vines and the leaves wilt on a hot day search carefully at the base of the vines for him. He can usually be located inside the stem within the first few joints from the soil. A slit in it with a sharp knife blade will permit you to take him out. The wound, if covered with soil, will quickly heal.

At the time of the second hoeing, work in a light dressing of nitrate of soda. When the vines reach across the rows the ends may be pinched out, which tends to develop the side shoots upon which the fruits are usually borne.

Holding the Soil Moisture in Summer

The summer inattention of the gardener is often due to ignorance as well as to shiftlessness. I have had old farmers remonstrate with me that I would injure my onions and other rowed crops by going through them so much with a wheel hoe, and thus drying up the surface. But in these days, anyone entitled to the name of gardener knows—or has little excuse for not knowing—that it is only by keeping the *surface* dry and finely pulverized that the moisture below the surface can be conserved. A simple illustration will serve to prove the physical principle involved in this fact. Take a strip of blotting paper, dip one end in water and see how the moisture soaks up through it to the top. Next take a similar piece, cut it in two, press the ends firmly together, and dip the lower part in water. The water refuses to cross the line, infinitesimal as the separation is, because the “capillary tubes” through which it rises, have been severed. In the same way, frequent cultivation of the surface of the soil, severs the capillary tubes through which moisture rises from the lower levels of the soil to the surface, and is there evaporated at an astonishingly rapid rate by wind and sun. Simple as this rule is, refusal to take advantage of it every year costs hundreds of gardeners a good many dollars each, both in actual income and possible saving, for it is as true of the garden patch as of broad acres of potatoes or corn.

One of the most important things to attend to, then, in summer work in the garden, is frequent shallow cultivation. It need not, and for most crops should not, be over two inches deep. The most efficient and rapid tool to use for this work in the garden, is the double-wheel hoe, until crops get too large to be straddled. After that it can be changed to a single-wheel hoe, and the leaf guards put on. It is advisable to use alternately the flat hoes and the cultivator teeth (the improved forms of the latter cut deeper in the middle of the row than they do near the plants). This prevents the formation of a hard crust just below the dirt

mulch, a condition which is apt to be the result in very dry weather, if the flat hoes alone are used.

Keep Down Late Weeds

Care should also be taken, of course, to keep down all weeds. Not only do they strangle the growth of legitimate plants, but they rob the soil of food and much needed moisture. *Remove weeds while they are small.* The work of pulling them up will be a great deal less. Often it takes from three to four times as long to weed a row out clean, where the weeds have been allowed to grow up as tall as plants, as it would have taken when they were first large enough to be pulled out.

The summer conservation policies above outlined—keeping the soil free from weeds and frequently cultivated—are necessary to carry through to successful maturity such spring crops as onions, parsnips, oyster plants, beets, carrots, etc.; and the later planting of pole beans, squash, melons, etc. The majority of these can be successfully stored, and, if the work is properly done, it is remarkable how well their quality can be preserved.

Summer Transplanting for Winter Crops

In addition to these crops, however, there are a number of others which may be planted quite late, and still mature, making real fall crops which may be used to fill up the space in the garden occupied before by early cabbage, lettuce, radishes, peas, green onions, early potatoes, or anything else that is out of the way by the end of July. It is not only a waste of space but usually a source of much weed trouble for the coming year to let such spots remain idle for half a season.

Among the first of such crops to be put in are the late cabbages for storing over winter. For this purpose, I prefer the Danish Ballhead type which can be planted closer than such sorts as the Autumn King, will head more surely, quickly and solidly, and is easier to keep. The

earlier in July these can be set out the better,—use plants from the seed that was planted the last part of May or early in June. In the same class are cauliflower, Brussels sprouts and kale, which is used for greens and has the great advantage of withstanding almost any degree of cold, so that its crumpled leaves may be gathered for use from under a blanket of snow. Brussels sprouts are altogether too little used and appreciated. In quality they leave nothing to be desired, being far superior to cabbage, they withstand any amount of cold (I have gathered them from stalks in the open in January), and the new sorts such as Dalkeith and Danish Giant bear abundantly.

As the soil, at this time of the year, is frequently quite dry, two things must be done, in setting out, to give the plants a sure start. In the bottom of the hole in which the plant is to be set, pour a half pint or more of water. Secondly, set the plants deeply and *firmly* in the soil; after setting out a row, go back over it with the balls of the feet, press down with all your weight on either side of the stem; there is no danger of packing the earth too hard.

Seeds to Sow for Fall and Winter

Of the seeds which may be planted at this late season, the most important are turnips, beans, and early beets. The early carrots would probably have time to mature, but they are very small, and it is much better to plant Danvers or Coreless in May or early June. Beets, however, are much better if they do not grow too long and get too large. The same is true of turnips, the most rapid growing of root crops. Petrowski, a smooth, yellow, small sized sort with a mild flavor is not so widely known as it should be. Golden Ball is also largely used. Of the beets I like Early Model, which makes a smooth, deep root, of fine color and flavor. Detroit Dark Red is even finer, but takes a little longer to mature. Ruta-bagas are generally used for stock feeding, but small varieties are excellent for the table: Breadstone is a high quality variety.

All the above may be kept through the winter; besides these there is ample time for early peas, lettuce and radishes to mature and furnish a very acceptable variety for the table during the several weeks of fall and winter. Gradus and Early Morn, tall sorts, and Blue Bantam and Laxtonian are all splendid quick growing peas. Grand Rapids for a "curly sort" and Big Boston for a heading variety, I consider the best of the lettuces for late plantings. Seeds should be sown a little at a time until September, the last plantings giving plants to transplant to the frames. Crimson Giant is an unsurpassed radish, very firm and mild.

The great secret in getting a "good stand" from seeds planted during the hot dry weather, is to "*firm*" the seed *into the soil*. Seed for these late sowings should be planted deeper than in the spring; and when planted by hand the seeds should be firmed into the bottom of the drill with the back of a hoe, or the sole of the foot *before* covering it. The necessity of having the soil thus pressed up firm and close to the seed is twofold. It insures more moisture being absorbed by the seed to start germination, and it gives the sprouting tap-root of the seed a congenial environment; whereas, when it strikes out into a soil space filled with hot, dry air, as is in the case in the germination of loosely planted seeds, it is doomed at the start.

July: Second Week

STARTING PERENNIALS AND BIENNIALS FROM SEED FOR NEXT YEAR'S GARDENS

A garden without hardy perennials is not complete. When once established these plants require a minimum of attention in proportion to the results they give. They are reliable, being for the most part free from disease, and they bloom year after year, meeting almost everything required in the way of color, height, and so forth.

Two things that have operated against greater use of perennials in American gardens are cost and lack of familiarity. Individual plants need not be very expensive. Many good varieties may be had for a quarter apiece, but when one comes to get the several dozen required for a good hardy border, or even for occasional use about the place, the cost is considerable.

No gardener, however, need be deterred from the generous use of hardy perennials because of this fact. He can grow his own. No matter how small his garden, he can produce dozens of good plants of some of the best types which, if bought from the nursery, would cost from fifty to fifteen cents each. And his only cash outlay will be a fraction of a cent apiece for his plants. Five or ten cents buys enough seed of most things to raise several dozen plants. Some new varieties may cost twenty-five cents a packet, but plants of these sorts cost fifty cents to two dollars each.

To be in prime condition to go through the winter and to produce the best results for next summer's garden plants should be started now. Among the best are hardy aster, bellis, campanula, Canterbury bells, hardy dianthus, delphinium, digitalis, hollyhock, peony, hardy phlox, hardy poppy, sweet William, tritoma, hardy alyssum, anchusa,

anemone, aquilegia, candytuft, chrysanthemum, gypsophila, helenium, hardy hibiscus, myosotis, hardy lobelia, pansy, viola or tufted pansy and wall flower.

Planting is not usually done until the latter part of July or early August, but now is the time to get busy and make out your order. If you don't know just what to get look round among gardens where these things are now in bloom and decide upon the varieties that suit your taste. By the time you have obtained your seeds and have your borders ready it will be time to plant. There are usually more seeds in each package than you will need, so an excellent plan is to make your first sowing early, using about half the seeds of each variety; then if anything goes wrong you can make a second planting in time to get good plants before cold weather.

Plant Seeds in Old Cold-Frame

At this time of the year there is one difficulty in getting a good stand. There is heat enough and to spare, but moisture is required. If your planting is done just after a soaking rain germination will generally take place before the soil has become dry again on the surface—but such a rain does not always come when the gardener wants it. Furthermore, a hard rain just after the little seedlings have germinated will sometimes almost wholly ruin them. Therefore, although the seedlings are best handled outdoors, a special place should be made for them.

Give the soil a thorough saturation just before planting and then maintain a mulch to conserve it until the little seedlings are well started. The longer watering can be delayed after planting the better. It tends, even when carefully done, to crust or bake the soil on top and to knock over the tiny seedlings.

The ideal place in which to prepare a bed is an old cold-frame or hot-bed. Then by the time the seedlings are large enough to transplant, other frames in which cucumbers or tomatoes may now still be bearing will be empty. If you

have no frame available as good results may be had if a little trouble is taken to prepare the seed bed properly. It should be elevated four or five inches above the soil level, to provide perfect drainage—an abundance of moisture is essential to success, but too much will prove fatal. The bed may be made easily by digging a narrow path round it, but more protection will be given if you make a temporary frame of boards six or eight inches wide sunk into the ground far enough to hold and extending a few inches above the surface like a low cold-frame. It is not necessary, however, to have a slope to the front. The frame need not be large—a three-by-six or a four-by-four frame will accommodate fifteen or twenty packets of seed.

Preparing the Seed Bed

The soil in this frame should be worked up and made as fine and smooth as possible. It should then be topped off with two or three inches of specially prepared soil. This is necessary because ordinary garden soil dries out or forms a crust on the surface that is bad for the very fine seeds to be sown, some of them so small that they are merely pressed into the soil instead of being covered.

Procure a quantity of leaf mold or very old, thoroughly rotted manure, and mix with some friable garden soil or with shavings from the under side of sod. If the soil is heavy add a little sand. Work this all together and then pass it through a coal sieve so that roots, lumps, small stones, and so forth, will be removed and every particle of soil will be finely pulverized. Spread this over the surface of your bed and press it down lightly with a small piece of board; then soak thoroughly with a fine spray.

When water ceases to soak in let it remain for twelve to twenty-four hours to dry out slightly on the surface. Then mark off little furrows three to six inches apart and just deep enough to be visible. For the smaller seeds the mark is more to get them in straight lines than to bury them. When only a few seeds are to be sown deep flats may be used. They

should be kept partly buried in the ground, or in a somewhat shady place until after germination; or a sheet of newspaper, moistened, may be placed over the box during the day and removed in the afternoon.

After sowing, the seeds should be covered lightly. Seeds the size of pansy seeds or smaller may be pressed in with a brick or with the edge of a board and then barely covered with a light sprinkling of prepared soil. Larger seeds, such as gaillardias and pinks, may be covered a quarter of an inch.

Guard Against Damping Off

One of the things most likely to cause trouble with the little seedlings, especially in warm, damp weather, is damping off. As a preventive sprinkle flowers of sulphur over the surface after the seeds are sown. Have a screen to put in place over the seed bed or the frame. This may be covered with cheesecloth, which lets a little light through, or with ordinary building laths nailed an inch apart. The frame should be supported well above the frame or bed to permit free circulation of air. Sometimes sphagnum moss or some other light mulch is laid over the surface of the soil after planting to help keep it cool and moist; if this is done the bed should be watched carefully daily and this mulching removed when the seeds sprout. If left on even a day too long it may result in tall, spindling plants.

As soon as the little seedlings are well up they should be given another thorough watering with a fine spray, as the soil will be getting dry and crusted again. Then cultivate the surface lightly between the rows and as soon as the first true leaves appear thin the seedlings out where they are too thick—a dozen strong plants will give you much more satisfaction than fifty poor ones. The insects that are likely to cause trouble to the small seedlings may be guarded against by sprinkling tobacco dust freely over the bed, and by spraying occasionally with Bordeaux mixture.

In four to eight weeks after sowing the seedlings will be ready to transplant. Most of them, with protection, will

stand the winter in the open; but the most convenient way of carrying them over is to set them a few inches apart each way in a cold-frame and transplant them again early in spring.

There will still be several weeks for the little plants to grow after this first transplanting and the ground should be well enriched. Use plenty of old manure, a little fine bone and a very light sprinkling of nitrate of soda. As the frame may be dust dry at this time of the year, the best way to get it back into shape for planting is to open up ditches with the hoe as near together as you can make them, and turn the hose in, letting the ditches fill up several times. Then fork the ground up and if necessary repeat this operation. Get the ground thoroughly soaked so that conditions may be just right to induce rapid root growth on the newly set plants.

Pansies, and plants of similar growth, naturally make stocky plants, and soon begin to crowd if not transplanted as soon as they are large enough. Some things, however, will grow up tall and spindling if left long in the seed bed; to get good plants they should be transplanted as soon as the third or fourth leaf shows.

July: Third Week

SUMMER WORK WITH STRAWBERRIES: CARE OF THE SPRING PLANTED BED; REMAKING THE OLD BED; POTTED PLANTS; STARTING THE NEW BED; FALL BEARING STRAWBERRIES

The home garden should produce an abundance of strawberries. There is little danger of having too many, because if the bed should happen to get ahead of the immediate demand for the table the surplus may easily be saved for winter. Rightly managed, a very small space will give an ample supply for both purposes. Extra-fine quality should be the aim in the home berry patch, and fortunately, with this crop, the best quality and the biggest yield go together.

Berries can be grown in almost any soil, but there is considerable difference in adaptation of varieties to different kinds of soil. In making a new bed it is well to select varieties that you know will thrive in soil similar to that which you have. When plenty of water is available, however, not so much attention need be paid to this. Though the berries revel in an abundance of sunshine, and bear early on a southern slope, the patch should not be located in too sheltered and early a spot, or there will be more likelihood of loss through late frost. Again, irrigation alters the case, for it may be used for frost protection, and proper handling of the winter mulch is also a safeguard.

Strawberries are one of the few things that do well on a rather acid soil, so avoid ground that has been recently limed. On the other hand, the ground can hardly be made too rich. Manure or fertilizer or both should be used freely. Only old, well-rotted manure should be selected, and if this can be applied to a crop preceding the berries so much the better. Of fertilizer, the basic formula, 4-8-10, is the

best. It should be thoroughly worked into the soil before planting, however, either broadcast or along the row. Fertilizer used directly under the plants at the time of setting is very likely to cause injury.

The system of growing most generally used is the matted or solid row. The hill system has its advocates and its advantages, but the suggestions herewith, unless the hill system is mentioned, apply to the matted row. With this system a new bed is generally made every second year, or a smaller one, for the same total amount of space, every year, so there will be first and second crop berries each season.

Care of the New Berry Bed

Often the bed that has grown two or even three crops is renewed in the same place. Sometimes the bed must be kept in the same spot, and then this practice must be followed. Generally it is less work to make a new bed. The berry grower, then, finds himself at the end of each fruiting season with one or all of several different jobs demanding his attention: The care of the bed that has just borne its first crop of fruit; the maintenance, if desired, of the older bed; the establishing of a new one, and the care of the fall or spring planted patch.

Care of the new bed which has borne for the first time depends largely upon the condition in which it has been left. If there are only a few weeds these can be pulled out or cut off at or just below the surface. Generally, however, the quickest and best way is to remove the mulch between the rows, taking one row at a time; to give a thorough cultivation, working in a top-dressing of fertilizer at the same time, and then to replace the mulch.

Another advantage of thus removing the mulch is that then the rows can the better be trimmed up to their bounds; they should not be over fifteen to eighteen inches wide. Runners, or plants that have rooted beyond these limits, should be cut off; the tendency of almost all plants of all varieties is to form too many new plants. If you want good

fruit the second season this must be guarded against by cutting out a good many of the runners and plants, even in the row. The plants should be five or six inches apart in all directions for the best results; closer than this, they crowd each other for light and air and there is not enough plant food to go round, resulting in a crop of undersized, unsatisfactory berries.

Renewing an Old Berry Patch

When it is necessary or desirable to remake or to continue the old bed that has rooted two seasons or more, drastic measures must be used. As soon as the last berries are picked, cut the rows over close with a scythe or a sickle, and rake with an iron rake; do not be afraid of giving rough treatment, as it makes little difference how many plants are pulled out. Burn the rakings to destroy any eggs or disease spores.

Then go over each row, cutting out the oldest plants and most of the new ones. Leave new, strong crowns eight to twelve inches apart. A handy tool for this job is the small combination hoe and prong hoe, which has teeth on one side and a narrow blade on the other. The blade should be well sharpened, so it can be used to cut off runners and to cut out plants, while the teeth come in handy for raking them out after they are cut.

The result may be a pretty sick-looking, skimpy bed, but do not worry about that. Give a good top-dressing of a complete fertilizer. This may be broadcast over the plants if you give it a thorough watering afterward to wash it off the leaves and down into the soil. A light top-dressing of nitrate of soda should be given in addition to the fertilizer.

Another method of renewing an old bed is to cultivate the passages between the rows; rake them over carefully and then root runners from either side. After these are established cut them off, and pull out the old rows.

Where to Start the New Bed

The making of a new bed of garden size is not a difficult task. The plants, being set out in late July or August, usually follow some earlier crop. For best results the ground should be as thoroughly prepared as for spring planting. If a horse is available thorough cultivation with narrow teeth will be the best way of getting the ground into shape; or the soil may be turned over with the hand-plow attachment of the wheel hoe, or forked up. In any case, get it fine and loose and mellow. Do not attempt to plant by simply digging out holes in which the plants may be set in hard-packed soil. The strawberry crop depends almost entirely upon the development of the large, fleshy roots made the previous season. Only by having the soil in the best mechanical condition can best results be obtained. Grass or sod ground should be avoided because of the probability of injury from white grubs, the larvæ of the June beetle, which attack the newly set plants. Select, if possible, a patch in the garden that was well manured in spring and has not been in sod for two or three years. Such a soil with a top-dressing before planting of a high-grade complete fertilizer—five pounds or so to each one hundred square feet—will make a beginning from which an early crop may confidently be expected.

The plants should have a clean bill of health; the most frequent cause of injury from disease is planting from infected plants. They should be young, vigorous and as fresh as possible. The roots of plants received by mail or express should be still in a fairly moist condition. If they are very dry immerse them in water up to but not over the crowns. If the stems have not been sufficiently trimmed at the nursery this should be done before they are soaked. The best plan is to puddle them in a thin clay-soil mud, which will adhere evenly to the roots; removed from the puddle and planted promptly, the soil will be brought into intimate contact with the roots, favoring a quick new start. The leaves, if large, should be trimmed back

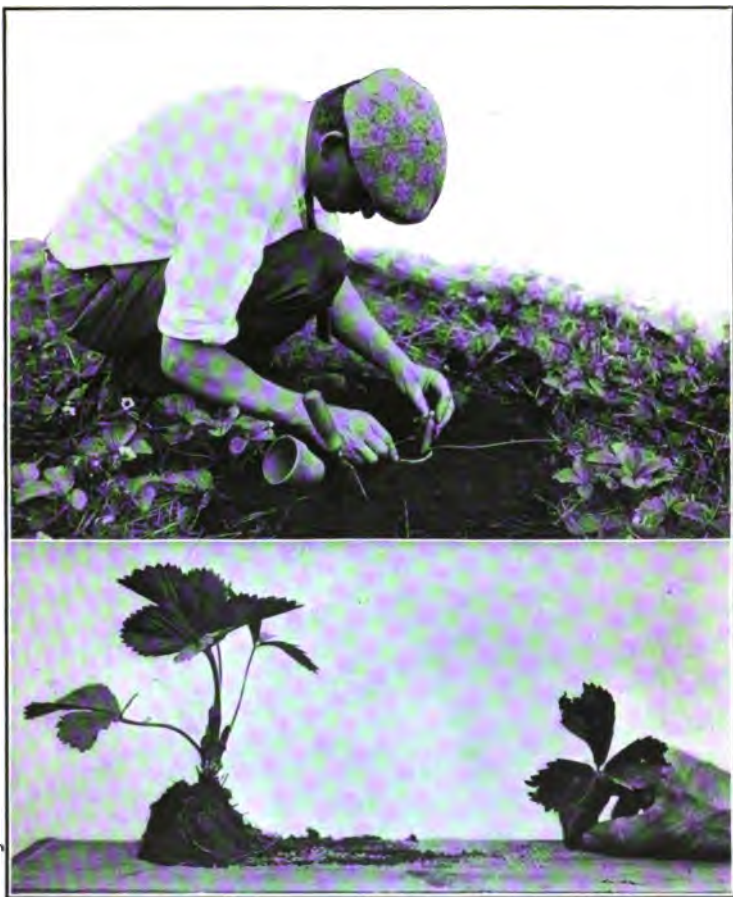


PLATE 17.—Making potted strawberry plants. The pot filled with soil is sunk level with the surface and the runner held in place with a clothes pin or small stone. (*Lower*) In taking up rooted runners for setting out a new strawberry bed, get all the roots and soil possible. Avoid diseased plants with purplish discoloration of the leaves like that shown at the right of picture.

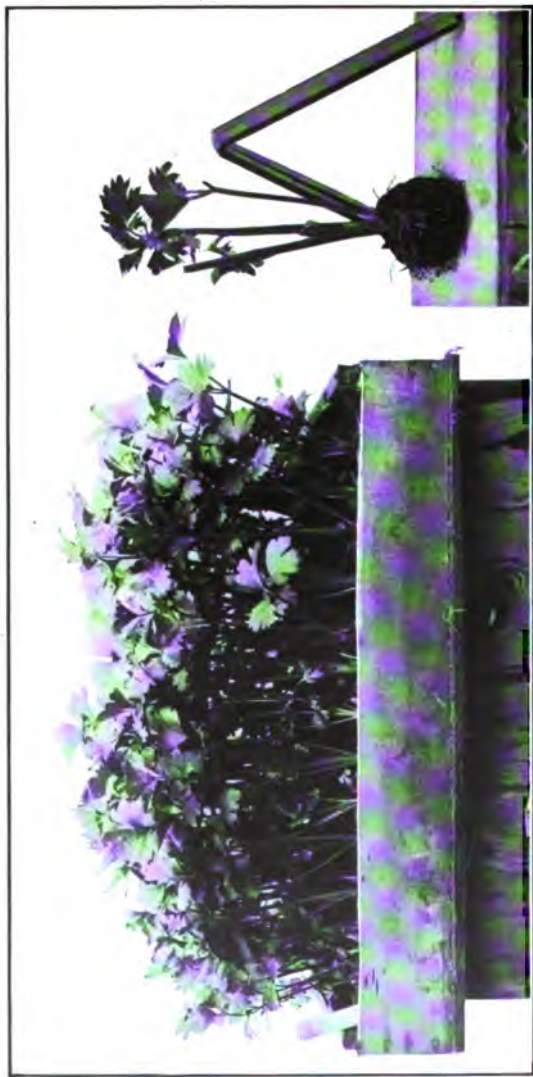


PLATE 18.—The success of the celery crop depends largely upon having large, thrifty, stocky plants, like those shown above. They should be trimmed back, even more severely than most plants when being set out. Do not plant deep enough to get any soil over the "crown."

and any that show the slightest trace of blight or leaf spots should be removed; it is better if all such plants are immediately discarded.

In setting the plants, three things should be kept in mind: Set on a freshly prepared surface; get the plants in firmly; cover them well up to but not over the crowns. If irrigation is available get the soil fairly moist before planting, then give a thorough watering after the plants are in.

Getting Plants for the New Bed

To root your own supply of plants, select only good healthy vines, and work the ground into good condition, just as the runners start, so they will have a congenial place in which to establish themselves. The first or tip plants from the runners and the first one or two runners thrown out by the plant are usually the strongest and are ready the earliest.

To get ideal plants—those which with proper care will give a full crop of the largest berries the first spring after planting—buy or root for yourself potted plants. These cost more and are a little more trouble to get or to produce, but they are worth the difference. Good potted plants of the standard varieties cost about three cents apiece. To produce them from the old bed all that is required is a supply of small pots. The soil is made mellow, as for ordinary layer plants, the pots are filled with earth and sunk to the rims, and the runners are held in place over them with small stones, small twigs or clothes pins, so that they will not be blown out of position.

"Matted Row" vs. "Hill" System

In planting for the matted row, the rows are marked off two or three feet apart and the plants are set from twelve to eighteen inches apart in the rows. When new runners start these are rooted between and to the sides of the original plants until a solid mat some fifteen to eighteen inches

wide is established. The plants in the mat should not be closer than five or six inches.

For the hill system of cultivation the plants should be set twelve to fifteen inches apart each way in beds of two to four rows, with eighteen or twenty-four inch paths between the beds. To achieve success with hill culture it is necessary that all runners be cut off as soon as they appear in the fall after planting. For this reason the plants should be set out as soon as possible, preferably in July, and surely not later than mid-August. In rich soil with plenty of moisture and good cultivation the plant will have a solid bushy crown nearly a foot across ready to produce a splendid crop of fruit the following June.

Fall Fruiting Strawberries

In setting out new plants do not fail to include a few of the fall-fruited or ever-bearing varieties, which have now been developed to a point where the fruit is of really fine quality and of good size. Progressive and Superb are the two best varieties of this type yet introduced. They are quite distinct and it would be well to plant a few of each. Plants set out now will fruit next June, but for a big fall supply the blossoms should be picked off the first part of the summer.

The mulch should not be applied until after the ground freezes, but it is well to make provision for it early in the fall. Clean marsh hay may be obtained in many localities, and there is nothing better. It is free from weed seeds and does not blow about so much as straw, nor pack down like leaves or strawy manure. In northern sections three to five inches of mulch is advisable. Even where it is not necessary for winter and spring protection of the plants, the mulch is of use the following season in keeping the berries clean and conserving the soil moisture.

July: Fourth Week

LINKING THE GARDEN TO THE HOUSE: SUMMER HOUSES; PERGOLAS; TRELLISES; VINES TO COVER THEM

Just as a home is more than a house, so the garden should be more than beds of vegetables and flowers. It should have individuality and character; should be a place that seems inviting, in which provision is made for resting as well as for work.

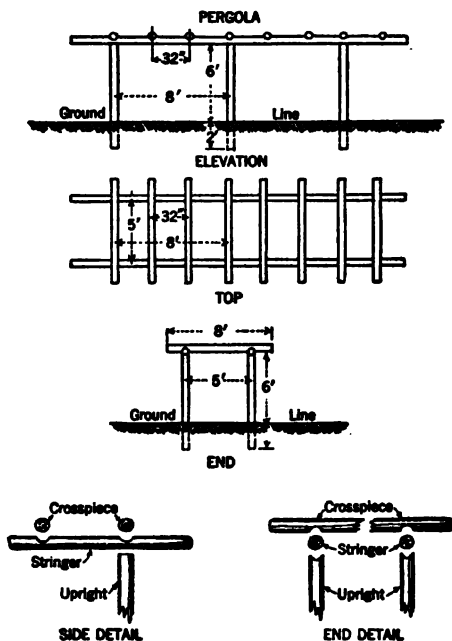
Some of the things that give a garden attractiveness of this kind are arbors, pergolas, summer houses, garden seats, sundials, and so on. Many kinds of garden furniture may be bought, but there is almost always more satisfaction in making the things yourself.

The pergola may be as simple or as elaborate as you wish. It should, of course, be in keeping with the architectural style of the house. Though primarily made for beauty, it has a utilitarian purpose in furnishing shade or serving as a support for a grapevine or rose bush. The lumber may be bought ready sawed or planed, or even unsawed posts may be used.

A home-made pergola of round unsawed chestnut, most of the material for which was supplied by the home wood lot, is shown in illustration Plate 15. This pergola extended from the house to the barn, and a small summer house was built into it halfway, making a delightful rest room for hot summer days. In many places a pergola over the path from the house to the garage or tool shed, with an open summer house like this, would be a constant pleasure throughout the summer.

The posts in this instance are set five by eight feet. The posts are eight feet long and are somewhat smaller than

ordinary fence posts. Cedar posts would be even more attractive. The costs of posts would probably vary from ten to twenty-five cents each. With the uprights set eight feet apart, the crosspieces on top may be placed either



twenty-four or thirty-two inches apart. These should be seven feet long. The stringers upon which the crosspieces rest should be eight feet long and should be slightly notched to hold the crosspieces. An auger post-hole digger is generally the most convenient tool with which to set the posts.

A Gas-Pipe Pergola

An excellent support for a grapevine and one that will last practically forever can be made of secondhand gas pipe instead of wood. Clamp fittings will save threading the

pipe. The uprights should be an inch and a half, the stringers an inch and a quarter and the crosspieces one-inch pipe; although a size smaller in each case would stand up for all ordinary purposes. The uprights should be supported on flat stones or bricks, or set in concrete. Second-hand gas or water pipe can often be bought very cheap. The fittings may be obtained from a greenhouse-supply company, and the only tools necessary to set up the pergola, if the pipe has been cut the proper lengths, will be a couple of monkey wrenches. If a support for grapes or roses is wanted a pergola of this kind will be found neat, cheap, durable and strong.

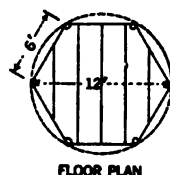
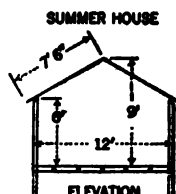
A Simple Inexpensive Summer House

Desirable as a pergola is, a small summer house will probably give more satisfaction and comfort for the money. A simple form of such a house is shown in illustration Plate 15. The floor is of planed boards, matched, supported on two-by-four-inch stringers; the roof is of rough square-edged boards, covered with a good grade of roofing paper. If preferred, shingles may be used.

The roof in this case is supported by round unsawed posts of chestnut, although cedar or cypress could be substituted to advantage. The posts are set firmly into the ground six feet apart in a twelve-foot circle.

Six two-by-four-inch stringers to support the floor are spaced two feet apart and the flooring is run at right angles to them. Six two-by-four-inch stringers support the roof, which pitches three feet from center to eaves. To make the roof sufficiently stiff furring strips of one-by-two-inch stuff are put between the rafters.

On one side two uprights form a door frame. Slabs are



run round part way up to stiffen the screen cloth or netting. The cost of the material, not including the screen cloth, is about as follows:

6 posts.....	\$0.75
200 feet 2 by 4's.....	2.75
250 feet board.....	5.00
100 feet furring.....	1.00
2 rolls roofing paper.....	5.00
Nails, etc.....	.50
Total.....	\$15.00

Another form of small summer house, costing only part of the above, can be made by erecting the framework of the house described and using hardy vines or rapid-growing annuals to cover it. The outlay in this case would be very small.

Protect the Trellis from Rot

Trellises are made in all shapes and sizes. Small ones of iron and galvanized wire will outlast a dozen wooden ones, but in many cases, wooden trellises are still desirable both because of cheapness and because they can be made of the exact size and shape desired. The two mistakes generally made in building trellises are leaving them unprotected where they enter the ground and building them too close to the house.

If the woodwork is protected where it enters the ground and an occasional coat of paint is given, a trellis will last indefinitely. The best and most permanent footing can be made of a few short pieces of angle iron, with holes at one end, bolted to the wooden uprights. These may be driven into the ground or set in concrete. They should extend a foot or so above ground, so the wood will be well above any grass or mulching that might collect moisture and cause rotting.

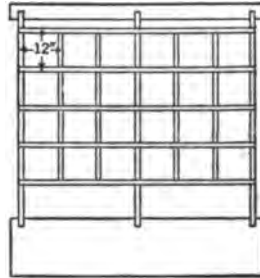
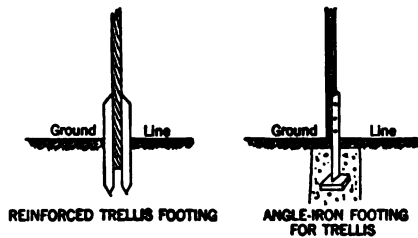
If this is too much trouble at least reënforce the base by driving down extra pieces, or by nailing or bolting the

trellis to an extra-heavy foot piece, and giving the whole base, before it is put into the ground, a coating of wood preservative or heavy tar paint.

Vines for Pergolas and Trellises; Sundials

The grapevine is not half appreciated for use on trellises about the porch; its big leaves furnish summer-long shade and in addition there is fruit in the fall. Two by seven-eighths-inch furring, which may be bought in bundles of fifty feet at any builder's makes ideal material for trellis work. The main supports should be made of heavier stuff, measuring at least two by two inches or two by three inches. A simple form of construction is shown in the accompanying cut.

Much of the success to be had with vines, climbing roses, and so forth, used to cover pergolas, arbors, trellises, summer houses, and the like, will depend upon the preparation of the soil in which the things are planted. Frequently the soil has not been used for garden purposes and is very poor. When you are building it will take very little more time to dig out and properly prepare a bed for planting. Dig out to a depth of a foot and a half, saving the good soil to use again and discarding the subsoil and litter. Fill in with good earth well enriched with manure and coarse



VERANDA TRELLIS

ground or knuckle bone. If the soil is heavy or the sub-soil is hard a layer of gravel, coal ashes, old plaster or similar things should be placed at the bottom for drainage.

A sun dial almost always adds to the attractiveness of the formal or semiformal garden. But it should not be left to stick up by itself. If the pedestal is tall some half-climbing plant may be trained about it. Baby-rambler roses are especially attractive for use about the sun dial, as they bloom continuously and are very hardy.

Unless the garden is formal, a field boulder of suitable shape and size, nicely weathered, and if possible put in position without disturbing the lichens, will make a much more suitable support for the sun dial than will a formal pedestal.

July: Fifth Week

CROPS THAT MAKE THE GARDEN RICH: "GREEN MANURING;" "SOIL BINDERS" FOR WINTER COVER; INOCULATING TO INSURE SUCCESS

The gardener who can buy, at a reasonable price, all the stable manure he needs, is the exception. Most gardeners these days are compelled to rely upon commercial fertilizers to enrich their gardens. It frequently happens that these are found to give good results for two or three years, only to be followed by decreasing yields and soil that packs hard or cakes. The reason is that when you turn under a good coating of manure in your garden, you add not only the various plant foods—nitrogen, phosphoric acid and potash—but also a large amount of decayed or decaying vegetable matter, or humus, and millions of tiny garden helpers in the form of friendly bacteria which attack the inert stores of plant food in the soil, making them available for use.

Some of these microscopic bugs have a special faculty of absorbing nitrogen from the air, making it available for the crop upon whose roots they house, and for other crops that may follow. The nitrogen-fixing bacteria live upon the roots of the legumes—peas, beans, vetches and clovers.

A large number of crops may be utilized to make the ground richer. As fast as a strip of ground is cleared, even if it is but a single row, it should be sown to a cover crop to be spaded under next spring. Besides adding humus and making conditions favorable to the development of bacteria, there are several advantages in having a growing crop on the ground throughout the winter. Such a crop forages the lower layers of the soil for food that most of the vegetable plants cannot reach, and brings it to the surface; it

captures remnants of plant food that would leach away during the winter, and holds them in storage until they are required again next summer. Whenever possible one of the legume crops should be given preference. Which is best for a particular job will depend upon conditions. If the ground is not to be utilized again until the spring, one of the hardy kinds, which will continue growth until after the ground is frozen hard and will begin again before it is thoroughly thawed, should be selected.

Crops for Green Manuring

If the ground is to be planted or trenched again this fall, there is still time to grow a heavy covering of beans, soy beans, cowpeas or field peas. The last named are the hardiest and will stand light freezing. If you have a horse or a cow any of these may be fed green or cured for hay, while the stubble and the roots improve the mechanical condition of the soil and add humus and nitrogen.

Rye and vetch sown after early potatoes or sweet corn, or some other crop harvested by early autumn, can be allowed to mature enough to make hay the following spring, before the later vegetables, such as tomatoes, melons and cucumbers, need to be planted.

Field peas are quite similar to the ordinary, climbing garden peas. When they are to be allowed to get their full growth oats or rye should be sown with them to furnish a support. There are several varieties: Canada peas are the hardiest; the marrowfats are of more luxuriant growth. A peck will plant a piece fifty by fifty feet, if they are to be spaded under. To mature, fewer would be required.

Cowpeas are more like beans than peas. New Era is a rapid-growing variety; a peck will be sufficient for a plot fifty by a hundred feet. Soy beans somewhat resemble garden beans, but grow very much larger. A good method of utilizing these is to have a supply on hand, and interplant them with other crops that will mature within two or three weeks. Planted in this way, between the rows of sweet

corn, early potatoes, lettuce, radishes, and so forth, the beans will have the ground well covered soon after the other crops are off, with a valuable supply of humus-forming material to be turned under just before killing frosts. They mature in about a hundred days, but for spading under they may be sown now. Plant as you would ordinary dwarf beans.

Two other late-summer catch crops of value on the home acre are dwarf Essex rape and buckwheat. Rape is one of the quickest-growing of all catch crops, and when a supply of green feed can be utilized late in the summer by a cow, a pig, a horse or even chickens, a supply of seed should be kept on hand and sown in any vacant rows or between rows of nearly matured vegetables. The seed costs only twelve to fifteen cents a pound and two or three pounds will be ample for use in this way. Under favorable conditions the crop will be big enough to use within six to eight weeks after sowing.

If bees are kept, or there are chickens to be fed, a small patch of buckwheat should be put in. For the bees a few rows through the garden will answer. For mature grain it should be sown at once; for a winter mulch, sown with crimson clover, or for spading under this fall, it may be sown at any time during the next two or three weeks.

"Soil Binders" for Winter Cover

If your soil is likely to wash or to blow, any parts of the garden that are growing late crops should be planted as soon as they are cleared this fall with crimson clover, vetch and rye, or rye alone. In latitudes north of New York the clover is liable to winter-kill, although this can be guarded against to some extent by sowing buckwheat with it. A pound of seed, costing about fifteen cents, will be plenty for a fifty-by-fifty-foot patch. It will be ready to cut green for the family cow or to spade under early in May. If crimson clover may be killed, vetch should be used. Either one may be sown for three or four weeks yet, but the earlier

the better, particularly in the case of the clover, as the roots are better protected if it has a chance to make considerable growth before hard freezing. For a fifty-by-fifty-foot patch about four pounds of vetch seed will be required, with about half that amount of rye or wheat.

The vetch may be sown as late as early October, but to be ready to fork under early in spring it should be put in in August or early September. A good way is to sow it with the seed drill between the rows of maturing vegetables. Rye will make a good start and come safely through even severe winters when sown after the last hardy vegetables have been taken up in late October or November. Use a peck or so of seed for a fifty-by-fifty-foot space.

At that time of the year there is likely to be continuous dry weather. Sow in ground that has been specially dug or cultivated. Get the seed well firmed in; roll with as heavy a roller as possible when the seed is sown broadcast. It is of importance, too, to have strong, fresh seed. If you buy locally get seed with a name behind it.

Assure Success by Inoculation

Success with the various legumes cannot be made certain, even when good seed is used and conditions are favorable, unless the bacteria that live upon the particular kind of plants to be sown are present in the soil.

When a crop of the same kind has been grown on your piece of ground, even if a number of years before, the soil will usually be found all right in this respect. But when a new thing is to be used artificial inoculation may be employed, at very little cost, to make success more sure. Soil in which plants of the same kind have been grown will answer the purpose. It should be freshly dug, kept from the sunlight, applied on a cloudy day or late in the afternoon, and immediately harrowed or raked in; otherwise, the bacteria may be killed in the operation. A peck or two will make an ample dressing for a fifty-by-fifty-foot plot.

Inoculation with artificial cultures has now come into general use. Like many other of the newer methods, you will find that it is very simple.

The bacteria are kept and transported in a "medium" or jelly, which must be diluted according to direction and spread over the seeds, which are then thoroughly mixed so that each one receives a thin coating of the solution. The bacteria, which live and work upon the roots, are ready to take up their abode immediately the plant germinates. Prepared "humus" is now used as a "container" for these bacteria, and will keep longer than the jelly mediums.

Usually where one kind of clover has been grown others can be started without any trouble. But when you plant things which you have not grown in your garden before, such as winter vetch, soy beans, cowpeas or alfalfa, or for garden peas and beans, if you do not seem to have success with them, get a small bottle of the bacteria and inoculate your seed before planting.

As in the case of the bacteria in the soil, those in the artificial culture are very quickly injured by exposure to the bright sunshine or to any drying wind. The seed should not be treated until you are all ready to plant.

August: First Week

GETTING HOUSE PLANTS READY FOR WINTER BLOOM: NEW PLANTS FROM SEEDS AND CUTTINGS; SUMMER CARE OF POTTED PLANTS; PLANTS FROM THE GARDEN FOR WINTER FLOWERING; MAKING NEW RUBBER PLANTS

The success of next winter's window garden depends to a very great extent upon what you do with your plants now. Any plant that is to be forced, or grown under unnatural conditions, must be carefully prepared for the extra tax put upon it.

Several classes of plants are available for winter use. There are the regular house plants, which are carried over from year to year and are kept solely for this purpose; there are new plants, obtained now and put into shape for the winter's work; and there are some outdoor garden plants that are suitable for continued use indoors when their duties in the open flower beds are over. In addition, when one has a small greenhouse or hot-bed available for spring use, a few of some of the bedding plants may be kept over for stock plants, from which to obtain cuttings early next spring.

It is not difficult to obtain all the plants for which there is likely to be room in the house, and to have them in the best of shape, if the work is taken in hand now. Usually this work is left until the last minute, when choice is limited, and most of the plants wanted are lost through a too sudden change from outdoor to indoor conditions. Plants for use this winter may be propagated now from cuttings or seeds and will make thrifty young plants that will give ideal results; small plants may be bought now from the florist at a

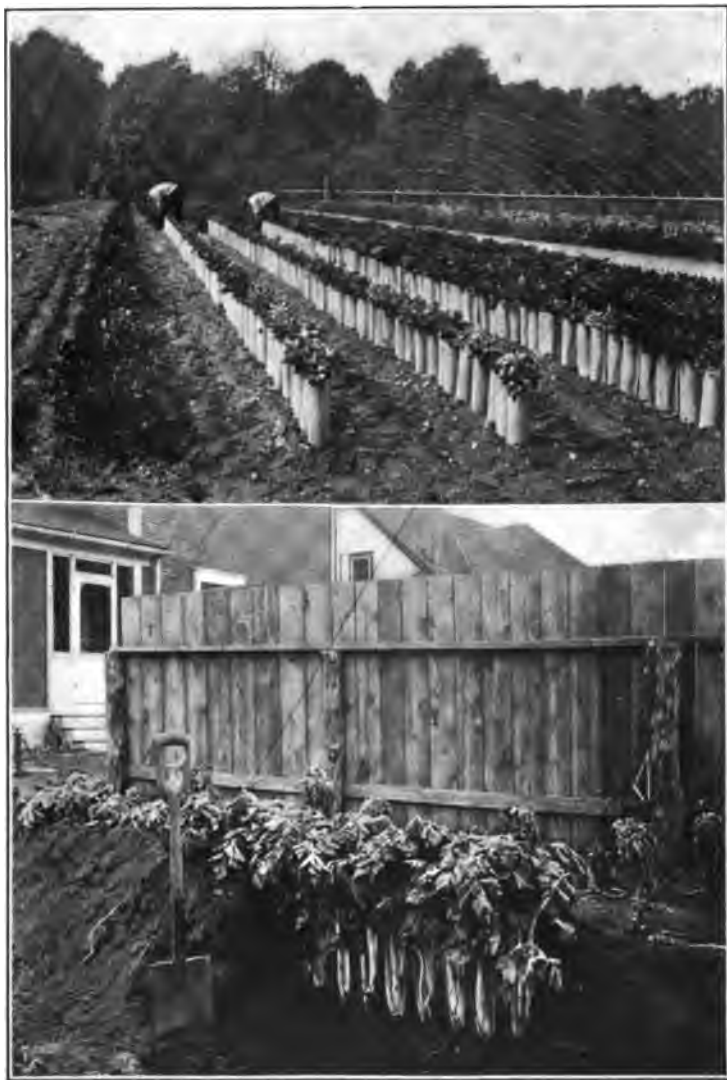


PLATE 19.—Modern methods of blanching celery in the home garden greatly simplify the work of growing it. Late celery for use until Christmas or so, can be stored and blanched as in the lower photograph.

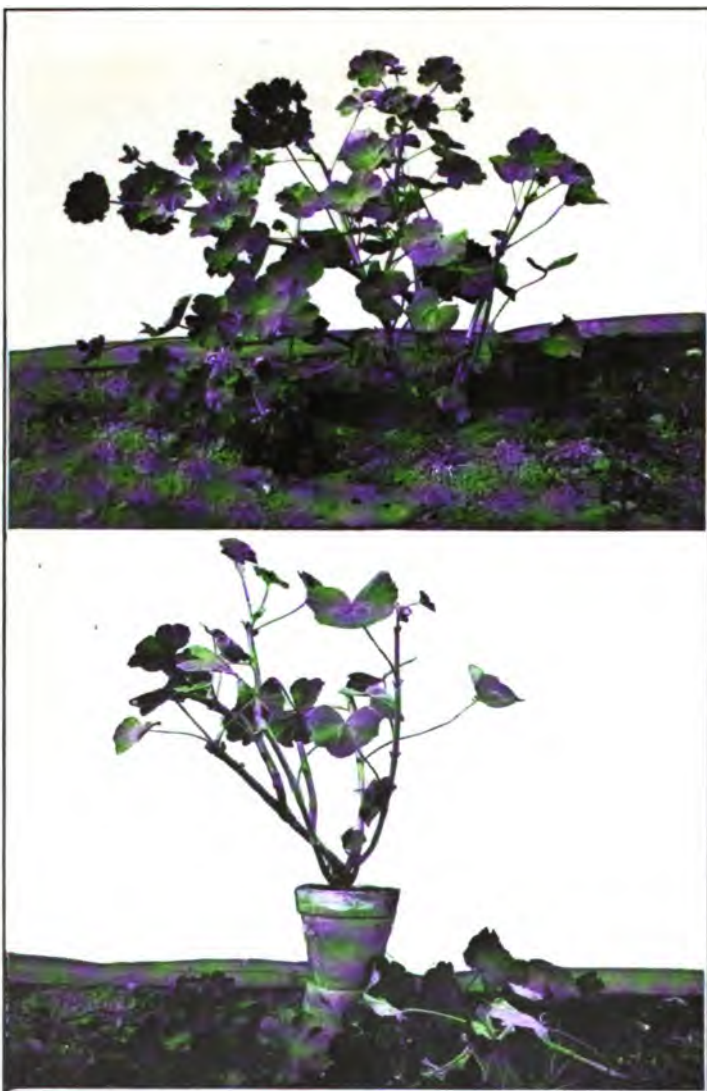


PLATE 20.—Saving a summer plant for winter bloom. Cut carefully about the ball of roots before lifting it; and then prune the top back severely, as in the lower picture, before potting it.

fraction of the price that will have to be paid a few months hence; or some of the plants that were set out in the garden last spring may be taken up and potted now.

Of these several methods the most difficult is to take up plants from the garden and make pot plants of them. Yet this method has several advantages. The plants cost nothing, you may select those of good shape, health and strength, and in any particular color and variety. With plants grown from mixed seed these last points are important.

"Potting up" from the Garden

To be sure of saving the plant and to give it the least setback in transplanting, the process should cover two or three weeks. With a sharp trowel or a long-bladed knife cut a half or a third round the plant, with the blade slanted in toward the root; the circle formed in this preliminary root pruning should be a little smaller than the inside circumference of the pot to which the plant is to be transferred—usually a four, five or six inch one. At the same time remove any buds or blossoms there may be, and cut back the plant quite severely, removing some of the oldest growth. Later make another cut round the plant. After two or three operations take out the plant carefully, cutting off clean all the long roots underneath. Give a thorough soaking some hours before "lifting" the plant, if the soil is dry. Then pot up carefully and keep in partial shade, under a tree or on the veranda, for a week or so. Cutting the roots in advance of potting gives the plant a chance to recover from the shock and also to form the feeding new roots that must be produced before it can establish itself in the pot.

Old plants that are kept from year to year should receive treatment according to their kind. Those that flower in winter should be rested during the first part of the summer, but started into more active growth about this time so they will be in the pink of condition for the beginning of the winter season. They may be cut back quite severely, leaving a framework of strong wood upon which the new growth

of foliage and flowers is to be produced. Unless they were repotted in the spring they should be shifted now, and usually it is best to use a pot only one size larger.

Summer Care of Potted Plants

During hot weather the plants will thrive better if the pots are sunk up to the rims in the ground under a tree or where they will be in the shade at midday. Two-thirds of the work of watering may be saved in this way, and the soil kept more evenly moist. To prevent the plants' rooting through into the soil below, a small cork or wooden plug may be put into the drainage hole in the bottom of the pot, leaving just enough of an opening so that all surplus water can drain out.

A cone-shaped plunger, five or six inches across the top and tapering to a sharp point, with a handle attached, should be used to make the holes in which the pots are placed. This will save a great deal of work, will make a hole of any diameter, and will leave a small air space directly under each pot, preventing soil worms from working up into the pot and providing better drainage and free access of air to the roots. The pots should be turned occasionally to prevent the plants from getting one-sided and to break off any roots that may have grown down into the soil.

New Plants from Seeds and Cuttings

Plants from seeds or from cuttings started now will be large enough for three or four inch pots and will be in prime condition by winter. To start the seeds, prepare a small bed either in a partly shaded place or where a temporary screen of some sort may be made. Water copiously before planting, and cover the seeds lightly. As soon as the seeds are well up and in the third or fourth leaf transplant to flats or small, individual pots.

The soil for the pots must be so rich as to carry several months' food supply in a very limited space, porous enough

so that water will drain through it readily, and well supplied with lime so it will not sour. Make a compost of about equal parts of friable garden loam or sod shavings and thoroughly decomposed manure. Old manure from the hot-beds, or emptyings from flats, is best. If the soil is very heavy, mix with it a little sand. A good dressing of wood ashes, which contain enough lime to keep the mixture thoroughly sweet, should be added, and also some bone dust. Two or three quarts of wood ashes and a pint or so of ground bone may be added to each bushel of the compost. This soil should be kept in a shed or in a barrel and soaked occasionally to keep it at an even degree of moisture.

Cuttings may be rooted readily at this time of the year, but care must be taken that they do not dry out. A convenient method is to mix half a bushel or a bushel of sand in a few square feet of the seed bed and to place the cuttings in this, keeping them shaded lightly overhead all the time, but with a free access for air. Trim the cuttings back well, as loss of water through transpiration is very great at this time of the year.

In starting a few dozen plants the saucer system is the most convenient: Take a shallow, water-tight dish and put in three inches of clean sand. Add water until it comes barely to the surface of the sand. Insert the cuttings in this. The sand must be kept thoroughly saturated, which will mean adding water every day in hot or windy weather.

Making New Rubber Plants

Rubber plants that have become too tall or have become leafless at the bottoms of the stalks may be made over by what is termed Chinese layering, or rooting in the air: Select a point in the stem several inches below the lowest leaves, or wherever the remaining upper portion of the stalk will make a shapely plant, and with a sharp knife make a slanting cut two-thirds through. Place in this cut a little live sphagnum moss, which can be gathered in most swampy places, or obtained from any local florist. Bind on with soft

twine or cloth strips a small piece of shingle or something similar, to hold the stem in its original position; otherwise it is likely to get knocked or blown over.

After a few days take out the moss, wash the wound carefully to remove as much as possible of the congealed milky sap, insert fresh moss, and then tie about it, extending several inches above and below, a ball of moss which will be several inches in diameter when finished. Old strips of sheeting an inch and a half in width are convenient for this purpose. This ball should be kept moist at all times, but do not use very cold water.

New roots will have formed in a few weeks. Then the moss should be carefully removed enough to finish the cut. Pot up the plant, using soil that is thoroughly moist but not wet. Keep in the shade and syringe daily for a few days, but do not water the soil again until it begins to get dry.

Another method is to saw a pot in two lengthwise, put some soil in it and clamp the two halves over the moss round the wound, letting roots go through into the soil so that the new plant is well established in the pot before the stem is completely severed. The old stem should be cut back to within a few inches of the ground, which will induce it to throw out side branches to form a spreading, bush-shaped plant, or material for new plants.

Mid-summer Potting

The work of potting may be greatly facilitated by having a low bench or table in a shady place. This bench should be three feet wide, waist high and long enough to accommodate several flats on each end, the middle being occupied by soil for potting, pots, and so forth. New pots should be soaked for half a day or so before using. Old pots should be thoroughly cleansed; let them soak for a day, then scrub with a cheap bristle brush and a supply of clean, gritty sand.

House plants that have been kept for a number of years may be given a new lease of life by taking them out of the

pots, carefully soaking all the soil from about the roots, and repotting in fresh, new soil in pots of the same size. They should be quite severely cut back at the same time.

Overwatering at the time of transplanting, even in hot weather, should be avoided. Until the new root system is well established the amount of water that the plant can take up is greatly limited. Sprinkling the tops, on the other hand, reduces the tax put upon the roots during this time.

Frequent syringing with clear, cold water, using as much force as possible, is one of the most important points in keeping the plants in a fresh, healthy, disease and insect free condition during the summer. Sharp watch should be kept for insect enemies, and tobacco dust or kerosene emulsion used at the first appearance.

August: Second Week

MAKING A NEW LAWN; REMAKING AN OLD ONE; PEONIES TO PLANT NOW

The lawn is the most conspicuous and permanent feature of the place. To avoid future trouble and expense, it should be well made at the beginning. Where the summers are hot and dry the best time to make new lawns or to remake old ones is in August or September, so that the newly started grass will have the benefit of fall rains, and yet have time to become well established before winter. When spring-sown lawns have not been wholly successful they should be tuned up early in the autumn, so they will go into winter in good condition.

In making a new lawn both the particular conditions that exist in each case, and the probable expense, should be carefully considered. Any set of directions followed blindly may get one into serious trouble, for varieties of grass and methods of soil preparation that are all right for one place or climate may be all wrong for others. Immediate results are often possible only at considerable cash outlay, especially if the lawn is large. A gradual method of lawn building, giving satisfactory results in the end, would mean a very considerable saving.

Take, as an illustration, the grounds about a newly built house: The soil, though probably fairly good in latent possibilities, has become run down, is without humus, and is covered with heaps of raw soil thrown out from the cellar excavation. If you could give the landscape gardener free hand he would have all this poor soil removed, together with six inches of unsuitable topsoil and subsoil, and fill in with ashes or gravelly soil for drainage, and good loam. When he was through he would have the foundation for a fine

lawn, but his bill—even loam and gravel count up when you buy them by the cubic yard—would be apt to cause some hesitation on the part of the average man.

Fortunately another course is possible. Poor drainage, due to a hard subsoil, may be improved with dynamite at very little expense. Half-stick charges, placed in holes ten to twenty feet apart each way, will open up the whole substructure of the soil. The poorest part of the excavated soil should be carted away or used for filling in depressions. The rest should be spread about, and plowed under as deeply as the topsoil will permit. A good coat of rotted manure should be harrowed in, and unless this has been put on two or three inches thick a dressing of high-grade fertilizer should be added.

Start with a Good Soil

If the soil is very poor, or if manure cannot be obtained, it will be better not to attempt to seed to grass at once, but to improve the soil first. This does not necessitate untidy appearance. Sown to rye and vetch, or to crimson clover, the place will be green all fall and early next spring. This crop may be plowed under in April or May, and the lawn made then; or a summer green crop may be grown, such as millet or oats, to be turned under in August or September. By this method even very poor soil can be put into good condition, with only one season's delay and at a saving of some hundreds of dollars for each acre of lawn.

Different types of soil require different treatment. The three types usually encountered are sandy or gravelly loam, loam, or clay. The sandy loam needs humus, which may be supplied by turning under green crops; or prepared humus may be bought by the ton. Heavy rolling to compact the soil after plowing and harrowing is desirable.

With a naturally good loam success is easy, provided the drainage is all right. The subsoil should be examined, and if necessary dynamited or tile drained. When the lay of the land is such that good natural drainage exists below

a layer of impervious subsoil, a moderate dynamiting will do.

The drainage of a clay soil should be attended to first. The topsoil may be improved and lightened by the liberal use of lime and manure. Coal ashes or sand, if available at a reasonable price, may be incorporated by shallow plowing or forking. Heavy rolling should be avoided.

All these methods are in the nature of preliminary work, affecting mostly the physical condition of the soil. It may seem like unnecessary trouble to remake your soil before you begin making your lawn, but as a matter of fact it is saving trouble for future years. Anything that will tend to insure permanent success from your first sowing will be worth while.

Preparing the Soil for Planting

Fertilizing is another problem, and a double-barreled one. It is desirable to give the young grass strong, quick growth, and also to incorporate in the soil a supply of plant food that will last for years. For the latter result a supply of high-grade complete fertilizer should be added to the soil when it is being harrowed or raked. The quick-acting plant food should be incorporated with the compost or top-dressing used upon the surface, to be immediately available for the sprouting seed.

Almost all new lawns should be heavily limed. Even when the soil is not more acid than is desirable, the physical effect upon either sandy or clay soils is worth the cost. Raw ground limestone is the best form for general use. Wood ashes are desirable, but when a large lawn is to be made it is cheaper to buy lime and potash in other forms. In buying ready-mixed fertilizer, a 3-8-10 formula will be suitable. The low percentage of nitrogen is made up for by the nitrogen added in the top-dressing and by an annual dressing thereafter. The soil should be thoroughly pulverized by harrowing and raking.

The eventual success of the lawn depends to such a great extent upon giving the grass plants a quick, strong start that

it will always pay to give in addition to this dressing of fertilizer a top-dressing of compost, rich in available nitrogen and in humus that will help to maintain an adequate supply of moisture near the surface. A compost soil such as is used in the greenhouse or for the flower beds, with the addition of two quarts of pulverized sheep manure to the bushel, will do.

Otherwise, a quickly prepared compost may be made as follows: Half a cubic yard of good garden loam or topsoil; 500 pounds of prepared humus; 25 pounds of hydrated lime; 15 to 25 pounds of fine ground bone; 15 to 25 pounds of pulverized sheep manure. These should be thoroughly mixed together and left in a compact pile for about a week; when screened the material will be ready for top-dressing. If the soil where the lawn is to be made is wet or heavy, substitute medium coarse sand for loam in the compost. This amount of compost will top-dress a lawn about forty by forty feet.

If the soil, after filling in and preparing, is so soft and loose that the foot sinks into it, it should be rolled before being given the final harrowing or raking preparatory to sowing.

Use Plenty of Good Seed

Sowing should be done preferably on a quiet day, as it is highly important to get an even distribution of seed. When everything is ready, however, particularly if there is promise of a rain, it is usually better not to wait. Even with the wind blowing, the seed can be put on quite evenly if the lawn is marked off into sections. A quick way of doing this is to take a little ground limestone or land plaster in an old watering can, marking out sections. To make doubly sure, it is best to divide the seed and make two sowings, the second at right angles to the first. After sowing, rake the seed in evenly and gently with an iron rake and give a fairly heavy rolling. See illustration Plate 21.

The greatest possible care should be exercised in buying grass seed. For a large lawn it will usually pay to make your own mixture. For the average lawn the most satisfactory way is to purchase a ready-made mixture, but buy

from a thoroughly reliable source. The quality of the seed may be judged to a large extent by the weight—average seed weighs from thirteen to sixteen pounds a bushel, while really first-class seed should weigh between twenty and twenty-four pounds. Be sure, however, that this extra weight is not due to an excess of clover seed.

Use plenty of seed. One of the most general mistakes in lawn making is trying to save on this item. An abundance of seed means not only quicker results, but surer results, and a lawn of much finer texture. Though as little as three bushels to the acre is often sown, eight bushels is none too much for immediate and certain results. The condition of the soil, the quality of the seed and the weather are factors that influence the amount to be used. As an acre contains about 43,500 square feet, the proportional amounts of seed for small lawns can readily be figured.

Watering and Cutting

Provision for copious watering should be made. An ordinary lawn sprinkler will answer, but remember that if water is applied at all it should be in sufficient quantities to wet thoroughly three or four inches of soil. Lighter waterings, which are so frequently given to "freshen up" the appearance of the lawn, are injurious, as they keep the young seedlings rooting near the surface, where they are most subject to injury from drought.

Do not be in any hurry to make the first cutting. Let the grass get several inches high. Then do not cut it close. For the first two or three times simply cut off the top, and the cuttings, unless heavy enough to mat down the grass, may be left where they fall. After that the machine may be shut down closer, but the lawn should never be shaved. Many people make the mistake of cutting the grass too short. This exposes the roots to injury. Do not cut the new lawn late in the fall; leave a generous grass mulch for winter protection.

Next to watering and regular cutting, rolling is the most

important item in maintaining a good lawn. A modern type of water-ballast roller, which can be made any desired weight, is preferable.

Renewing an Old Lawn

When a lawn is run down the question is always whether it will be better and cheaper to renew it or to remake it. If the trouble is neglect, surface remedies may be sufficient; if it has petered out in spite of fairly good care, the trouble probably lies in the substructure, and only remaking it will put it into good shape. Doctoring up a lawn made on a poorly built foundation is merely throwing away money and work.

When the lawn is bare in patches, although the rest of it seems to be in fairly good condition, fork up the bad spots, incorporating fine, well-rotted manure, or compost, and sow thickly with a mixture suitable to your climate and conditions. The back of the spade can be used instead of the roller for firming down remade spots. At the same time, go over the remainder of the lawn, after cutting it quite close, with a steel rake and give it a vigorous combing, loosening up the soil about the roots. Give this a generous top-dressing with compost to which seed has been added. Then give a thorough watering.

When the lawn remains ragged looking in spite of care, with apparently a good condition of soil, the trouble is usually caused by weeds or undesirable grasses. In some lawns, particularly in the Northern States, there is too much clover, sometimes the result of improperly mixed seed, sometimes from volunteer plants.

Uneven or rough lawns can usually be leveled up by filling the hollows with good soil. If this is put on *just after the grass has been cut*, and is not made too deep, the original grass will come up through it; otherwise reseeding will be necessary. Care should be taken to put this soil on in layers of not more than two or three inches, and beat each successive layer down firmly with the spade.

It sometimes happens, particularly in rather heavy soils,

that lawns that have been regularly treated with a heavy roller begin to suffer from what is called "surface cohesion." The remedy is the use of a spiked tamper or roller which perforates the sod, making small holes every few inches. These admit air and moisture and the plants are stimulated to new growth.

Peonies to Plant in August

A first-class collection of peonies is always desirable and yearly becomes more attractive. The growing of this flower is easy, provided a few fundamental points are attended to. Any soil in good mechanical condition is suitable, though the plant responds well to a little extra care and nourishment. It is not advisable, however, to use fresh manure in too close contact with the roots. The roots require dividing at intervals when they may have become so crowded as to interfere with their flowering. At all times the soil must be kept loose and free from weeds. In planting the roots make sure that the eyes are two to three inches below the surface. Even if small roots are started, full space must be allowed for growth, the rows being three or three and a half feet apart, the plants set two and a half or three feet apart in the rows.

The best season for planting is the end of August or early September, though peonies may be planted at any time from mid-August until growth is too far advanced in the spring. The following are among the best varieties: Couronne d'Or, pure white; Felix Crousse, rich red; Festiva Maxima, white; Duchess de Nemours, white; Edulis Superba, rich mauve pink; Monsieur Jules Elie, light lilac rose; Madame de Verneville, white with bluish center; Marie Lemoine, pure white and cream; Grandiflora, rose, shaded white; Baroness Shroeder, flesh white; Livingstone, light lilac rose; Monsieur Du Pont, pure white, center splashed crimson; Delicatissima, pale lilac rose; Venus, light hydrangea pink; Claire Dubois, clear rich violet rose, tipped silvery white; Delachei, violet-crimson, tipped silver; La Tulipe, lilac white; Modiste Guerin, light solferino red.

August: Third Week

EVERGREENS AND SHRUBS FOR FALL PLANTING: PLANNING AN ARTISTIC PLANTING; VARIETIES FOR SPECIAL PURPOSES

First on the list for fall planting in point of time come the evergreens. These should be got in as soon after the middle of August as possible, unless belated July weather or drought prevent. They include the broad-leaved evergreens, such as rhododendrons, *Kalmia* or mountain laurel and box, as well as the conifers—pines, hemlocks, spruce, cedars and others.

Although the broad-leaved evergreens are perhaps not essential to the planting of a small place, there are few grounds so small that at least a few of the conifers cannot be used to great advantage. Conifers form the most dominant and permanent feature of the place, and for that reason one should be certain that the best possible situations have been selected before they are put in.

As a rule any mass planting of evergreens should be kept well to the north or west of the house. This is desirable where their services are required as a windbreak and shelter; but, aside from that, if planted to the south, the shade they will give after several years' growth is pretty sure to be too dense, and thus a somewhat gloomy atmosphere is created. It is a great mistake, however, to think that they must be planted in straight rows or plots, as one so frequently sees them. An artistic grouping will require no more trees and will prove just as effective for any practical purpose as a stiff, nursery-looking row. For sure results stick to the common sorts. White pine will grow in most soils and will live for generations; it is one of the fastest growing of all the conifers. American Arbor Vitæ is excellent for both row and mass planting; although the uni-

versally used California Privet has of late replaced it for hedge work, it is still the best thing to plant for a tall, stiff hedge. For single specimens *Juniperus Virginiana* is one of the best that can be had and is almost as artistic in effect as the famous cypresses of Italy.

The Use of Shrubs

The one object in using shrubs of course is to make the place beautiful; but there are, in general, three ways of using them toward this end. As a background for lower growing plants, flower beds, or lawns; for hedges, boundary lines, or screens; and for the beauty of their flowers or foliage, berries, or bark, either in beds or as individual specimens. Of course these three uses are seldom distinct and separate—which only illustrates further the many-sided advantages of shrub plantings.

The first thing to do in selecting shrubs for the place is to determine in which of these ways we wish to use them, and how extensively; and the best way to get an accurate idea of our wants or needs (for the natural "lay of the land" and other existing conditions will determine to a great extent the shrubs we should select) is to go over the ground carefully, sketching down the various groups, hedges, screens, or location of individual specimens we may wish to place. Then put these all down in proportion on one plan, to be used as a guide and kept for future reference. Of course the whole thing need not be carried out at once; we may put in a hedge of barberry this fall, along the front of the place, and a couple of hardy, large-flowered hydrangeas well down the front walk to give a semi-formal touch to the approach. But that rather ugly corner back by the garage may have to wait a year longer—being screened temporarily by a group of *ricinus* (the giant castor-oil plant), or even by homely sunflowers.

The shrubs suited for these several purposes are not divided into any hard and fast groups. All of them are available for more than one of the purposes mentioned

and several are adapted to any purpose. But a simple classification is of considerable help in making selections.

Shrubs for Single Specimens

Some of those especially suitable for single specimens on the lawn or about the grounds are hardy hydrangeas (*Hydrangea paniculata*, var. *grandiflora* and *H. arborescens*, var. *grandiflora*); the Mock Orange (*Philadelphus*); Lilacs (*Syringa*), of which there are many fine new varieties not yet generally known but as easy to grow as the old sorts; the beautiful Japanese maples, with foliage of many shades of color and striking forms; that old, early-flowering favorite of unequalled fragrance, the Strawberry shrub (*Calycanthus floridus*); Viburnum; Smoke tree (*Rhus cotinus*); White Fringe (*Chionanthus Virginica*); Buddleia, the butterfly shrub, of which splendid new varieties have recently been introduced; Rose of Sharon (*Althea*); and the universally popular but quite indispensable Deutzias, Weigelas, Forsythias and Spireas, some of the newer varieties of which, though one seldom hears about them, are just as great improvements over older sorts as are the newer varieties of roses and annuals that are brought to the attention of every flower lover.

For Beds and Borders

Shrubs for use in mass planting, in the shrubbery border, or for screen plantings along the boundary lines, may be considered in high-growing and low-growing groups. In plantings of any size they are generally used together, and in disposing them the tallest things should always be kept at the back, grading down to the lowest at the front. The shrubbery border, unlike the hardy border and the flower beds, is usually made with an irregular or wavy outline and varies greatly in width, so that alternate recesses or bays and projections or promontories are formed, and the more informal or natural this outline can be made the more pleas-

ing will be the general effect of the planting. Among the taller of the common shrubs are rhododendron, laurel (*Kalmia*), Dogwood (*Cornus florida*), Lilac, Sumac (*Rhus*), Golden Elder (*Sambucus nigra*, var. *aurea*), the taller Spiræas and viburnums, Forsythias, and Honeysuckle (*Lonicera*).

Low-growing shrubs which can be relied upon are spirea, Forsythia, *Deutzia gracilis*, *Deutzia Lemoinei*, *Berberis Thunbergii*, *Spiræa callosa*, *Clethra alnifolia*, *Weigelia*—low-growing varieties—*Calluna vulgaris*, *Andromeda floribunda*, *Berberis aquifolium* and *Azalea amana*.

Shrubs for Hedges

Those especially adapted for hedges are the following: Barberry (*Berberis*), for low, informal hedges; California Privet, for semiformal or informal hedges, especially in shady places; Japanese Privet, for low-spreading informal hedges; Japanese Quince (*Pyrus Japonicus*) with scarlet, showy flowers; and Boxwood, especially useful for hedging in the flower garden and for neat formal hedges, but not so hardy as the foregoing.

Replant Peonies this Fall for Abundant Bloom Next Year

It will soon be time to reset the peonies. Old plants are often poor bloomers. The plants may be shy-blooming by nature. The clumps may have been growing from ten to twenty years in the same place, until the soil has become impoverished. The location may be dry in the blooming season, so the peonies have not received proper fertilization and culture.

Prepare for replanting by selecting a place now where the soil is ordinarily moist, not wet; dig holes two feet deep and three feet in diameter; save the richer topsoil and discard the poorer bottom soil; place well-rotted manure, preferably cow or sheep manure in the bottom of each hole to the depth of six inches and dig in; fill the holes to the

top with a mixture of two-thirds soil and one-third leaf mold, thoroughly well-rotted manure and sand.

In early September take up the clumps of peonies and divide them in such a way as to leave only four to six eyes, which produce next year's shoots, on the top of each division. Plant these divisions in the prepared places, deep enough so that the crowns will be only three inches below the surface. Deep planting sometimes causes shy blooming. Cover the surface of the soil thickly with coarse, strawy manure, and leave this covering on till early next spring. Water applied in sufficient quantity to reach the bottom of roots once or twice each week in late April or May increases the number of blooms in a dry season and improves their quality.

If it is desired to plant the peonies in a bed the whole bed should be excavated and prepared in the same manner as directed for making the holes, and the peonies should be set three feet apart each way. Peonies need heavy fertilizing each year with stable manure or bone meal, or both, and they need plenty of water in the blooming season to give the best results. Peonies thrive well in a partial shade, and in such a location the blooms retain their color longer.

August: Fourth Week

PLANNING AND BUILDING A SMALL GREENHOUSE: MATERIALS; CONSTRUCTION; HEATING

A mistaken idea as to the cost keeps many persons from trying to put up even a small house. The ready-made patent framed greenhouses with all the latest devices and niceties of construction, are worth what they cost, but the man who cannot afford one of them can put up a perfectly practical house at a figure that he can afford if he buys his own material and does his own work. It is now possible to buy, at a reasonable price, a complete small house, heating system and all, that comes all cut and ready to erect, and can be put up in a few days' time. A small greenhouse will pay as good dividends as the frames or the garden.

If building is begun at once you can have your house for use this fall and winter, as well as to grow next spring's supply of plants.

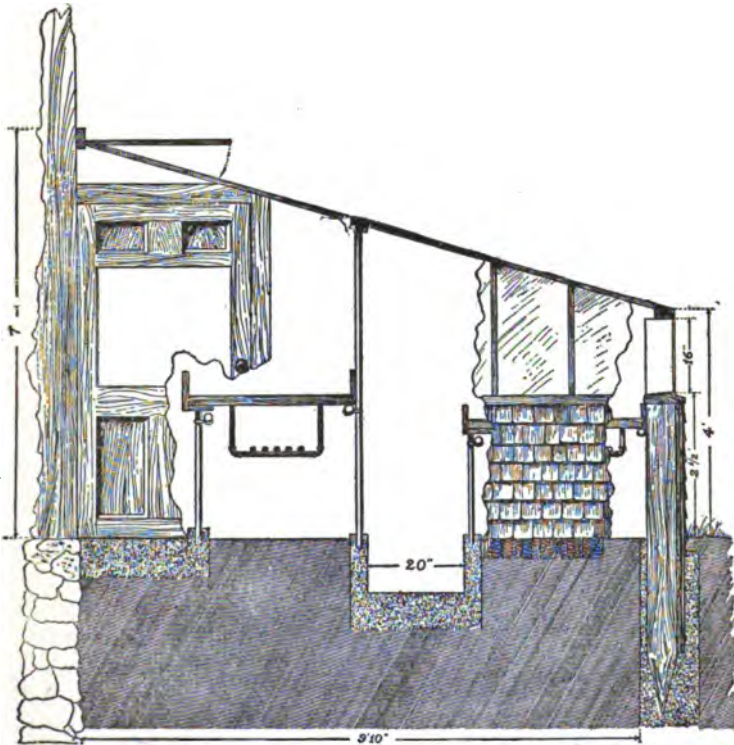
The simplest type of greenhouse is the "lean-to." It is the cheapest and easiest to put up. It may be constructed against the south wall of the dwelling or some other building. Or it may be built into the veranda. It is often possible to heat a house of this kind with the same heating plant that is used for the home.

The Construction of a "Lean-to" House

As the wall of the building against which the "lean-to" is to be built forms its north side, we have to supply a south wall, the two ends, and the roof. Sometimes the south wall has a row of glass, which is desirable, but not necessary.

The walls may be made of either concrete or post-and-board construction. Which would be best to use will depend largely upon how difficult it is to get sand and gravel

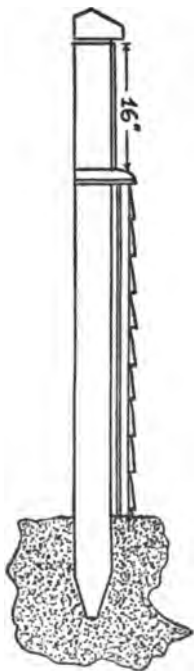
in your locality. Once done, however, concrete will last practically forever. If concrete is used the wall should be put down at least to the frost-line, and be four inches or more thick above ground. Use more cement in proportion to the sand and gravel than for ordinary walls. A



Cross-section of 10 x 20 lean-to house.

mixture of 1 to $1\frac{1}{2}$ parts cement, 2 of sand, and 4 of gravel or broken stone will be right. For the post-and-board construction posts are put into the ground every four or five feet apart, and the wall built on the outside. Cedar is the best wood to use for the posts, but chestnut or some other local sort which does not rot quickly will answer the pur-

pose. The *corner* posts must be square, and it is better to have the others so. The posts are carefully "lined up"; a layer of boards, preferably tongued and grooved, is put on; over these a layer or double layer of building paper; another layer of boards; building paper; and then shingles, siding, or stone-surfaced roofing.



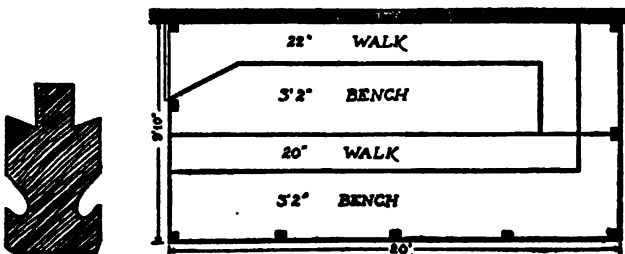
Detail of side-wall construction.

On top of the front wall is placed the "eave plate" or sash sill which forms the support for the lower ends of the sash bars (the long narrow bars which support the glass). At their upper ends the sash bars are held in place in the "ridge." The ridge, in the case of a lean-to house, is fastened securely to the wall of the house against which the greenhouse is being built. If the sash bars for the roof are not over six or seven feet long they will be strong enough to support the glass without any bracing, or "purlines" as they are called, under them. For sash bars longer than that some support is necessary, and the strongest and most convenient thing to use is pipe, an inch in diameter being amply strong for a small house. Secondhand pipe is perfectly good for the purpose. At the ridge or peak of the house there should be one or more hinged ventilators to provide for cooling the house on bright hot days. At each

end of the house, in place of the sash bar, an "end bar" or gable-rafter is used. This has the shoulder for the glass on one side only, and is grooved out on the other so that the glass in the end or "gable" of the house can fit into it, making a tight, secure joint. The forms of the various kinds of pieces or members used may be seen from the cross-sections in any greenhouse material catalogue.

Material Required for a 20 x 10 Lean-to House

Let us figure out just what is needed for a lean-to house, twenty feet long and approximately ten wide. Suppose we can get 7 feet of headroom on the wall against which we wish to build. Then we can figure on a height of four feet for the front wall, which will require 6-foot posts, as they should be set at least two feet into the soil. For the front wall then we will require five 6-foot posts; double boarding enough to go from a foot below the surface to $2\frac{1}{2}$ feet up the posts (twice $3\frac{1}{2}$ feet x 20 feet), or 140 feet;



Ground plan of 10 x 20 lean-to house.

20 feet each of 2 x 4" eave-plate and 2 x 6" sill; and ten lights of 16 x 24" double-thick glass. For the ends there will be required 4 9-foot posts; approximately the same amount of boarding as for the front wall; 20 feet of 2 x 4" sill; 50 feet of "side bars" (to hold the glass); and 60 square feet of glass. It is usually possible to pick up a secondhand door of some local contractor, at a very low price; or one may readily be constructed of boards and roofing paper or shingles.

For the roof there will be required 20 feet of ridge, 13 10-foot sash bars, 2 10-foot end bars; and 3 ventilating sash. A little may be saved on the ridge by having it sawed in two vertically, as it will support the sash bars just as well and fit more snugly against the side of the house. Get the style of sash bars known as "drip" bars—which means that they do *not* drip! If you get the ventilating sash made the right size you can easily put the glass in yourself.

Each sash will require a "header," or cross piece between the sashes, where its lower edge rests.

To support the middle of the sash bars a wooden rafter and wood posts may be used, but a much more convenient and lasting support may be had by getting 20 feet of 1-inch pipe—secondhand will do—and two 1½-inch pipe posts six feet long. If two additional pipe posts are secured and placed near the ends of the house they will both strengthen the construction and help make a neat, strong support for the middle bench, to be put in later.

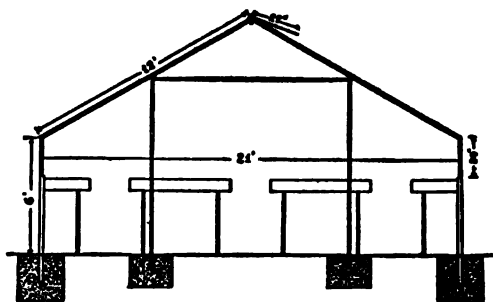
Itemizing these things, and including the glass for roof and the fittings, etc., which will be required, we have the following list of materials. The cost will vary. I have built a house at the figures given here, but they are low, and I was able to get some material secondhand.

300 feet of inch boards, for walls	\$9.00
9 posts (5 6-foot; 4 9-foot long)	3.00
1,000 shingles, for walls	4.50
6 boxes 24 x 16-in. double thick glass, \$18 to	24.00
10 feet 2 x 4-in. ridge80
13 10½-foot drip bars, for roof	3.25
2 10½-foot end bars, for roof75
50 foot side bars, random lengths, for gables	2.50
20 feet 2 x 4-inch eaves plate	1.60
20 feet 2 x 6-in. sill	2.20
20 feet 2 x 4-in. sill, for gables	1.60
20 feet 1-inch iron pipe, secondhand	1.00
4 6-foot 1½-inch pipe posts	1.50
4 1½x 1-inch split-T's50
15 pipe-straps, to fasten purlin to bars25
2 gable end-fittings for purlin20
3 ventilating sash, for 3 lights, glass	3.00
3 continuous headers for same50
6 hinges, with screws, for ventilators75
1 roll building paper	2.00
75 lbs. putty, greenhouse	3.00
Hardware, paint, and miscellaneous	5.00 to 10.00

The posts, boards, shingles, and the building paper may be had at a local dealer's. The other things should be ordered from a regular greenhouse material company.

A Larger House

If you happen to live in a section where many of your friends and neighbors have gardens, it will probably repay you well to put up a larger house and grow extra plants to sell in the spring. For a small practical house of this sort, two good forms of construction are shown in the accompanying cuts. The details of construction are much the same as those shown for the former house already described. Special fittings are made to use in connection with the pipe posts, frame, and supports, and there is no reason why one ordinarily skillful with tools cannot do the biggest part of the work of building a small house himself.



In many parts of the house iron may be used in place of the wooden parts I have described. The cost is more, but repairs are eliminated. Before building a house of any size, you should get catalogues from some of the greenhouse companies and make yourself familiar with the different methods of construction.

No matter how small your house is, however, plan it carefully in every detail before ordering the material. The plan and list of material above should not be used unless it fits in with your particular requirements.

Beginning Work on the Greenhouse

As you may buy the posts, boarding, shingles, etc., locally, you can get the work well under way without waiting for the other materials to arrive. Level off the site you have selected, and make your measurements carefully. To get the plan square, be sure that the *diagonals*, from opposite

corners, are of exactly the same length. Mark the lines for the outsides and ends plainly by stretching stout cord or a garden line to stakes set a couple of feet *beyond* where each corner is to be, so that the points where the strings cross will indicate the exact point where it is desired to have the outside corners of the greenhouse. All the posts should be set in very firmly; the best way is to pour concrete around the bases. Set the two corner posts first and line up the rest carefully with these. The best way is to have the posts a little longer than needed, and saw them off level after they are set.

The 2 x 4 inch eave plate can go into place next. And then, leaving just enough room for a light of glass to go in the 16-inch way, fit the 2 x 6 inch sill 16 inches below this, mortising it out carefully to fit snugly about the posts. The bevel or shoulder in the sill should come just even with the outside of the posts, so that the latter will not be in the way of the glass, which may be put in, without any side bars, in a continuous row.

The walls may then be constructed fitting the boards snugly under the 2 x 6-inch sill, and working down toward the ground. Put the ridge in place, being sure that it is very secure and makes a water-tight joint with the side of the house. (If this cannot be secured by the use of white lead, use a strip of roofer's tin.) Then mark off carefully on both ridge and eave the places for the sash bars. Then start with one end bar, and nail the bars into place, using *finishing* nails. Try every third or fourth bar with a light of glass to be certain that you are getting them spaced exactly right. The purlin, or pipe, which supports the sash bars does not have to be directly on the middle. In this lean-to, for instance, it comes a little to one side. Ascertain carefully, however, just where it is to come, and mark the bars on the bottom side with a chalk-line. Then, with the purlin clips, fasten the purlin into place. Put the pipe post supports in place, being careful to get them perpendicular and in line, and set the bottoms in concrete. *Do not touch the posts* while the concrete is setting, which will take two or three

days, during which time the doors and gable bars may be put in place. All will then be ready for the glass.

How to Lay the Glass

Put the ventilators on first. In putting in the glass you will notice that each light is slightly curved. Put the convex side up. Put in one complete row at a time, beginning at the eaveplate, and letting the glass come down just flush with the outer bevel. "Work up" a generous supply of putty until it is very soft and elastic. (If necessary add a little linseed oil.) Put on the putty so thick that the glass can be firmly *imbedded* in it, by pressing down hard along each *edge* of the glass. The lights should be lapped slightly— $\frac{1}{8}$ to $\frac{1}{4}$ of an inch—and held firmly in place by greenhouse glazing points. There are several types of these, but I like best the style known as Siebert's. After a complete row of glass is put in, scrape off the surplus putty on the under side. Go over the outside edges of the glass with linseed oil and white lead, mixed to the consistency of thick paint.

One of the secrets in building a house that will *last* is to have the painting done thoroughly, and all crevices and holes filled with paint or white lead, and all joints white leaded. Go over the whole frame carefully after it is put up, before putting in any glass; and again after the glass is put in. Be sure to buy a good paint. If you do not *know* about it, write to your State Experiment Station for information.

In the estimate for material I have not included benching. Two by four scantlings and second-hand or second-grade boards may be used; but as a general rule, the cheaper the bench put up the sooner it will have to be repaired. For a house like the lean-to described, if you can't afford a tile or slate bottom bench, I would recommend concrete for the bottom and sides of the walk, and iron pipe posts and cross-pieces for the benches. Split-fittings, especially designed for making bench-frames, may be bought quite

cheaply, and with them such a frame may easily be put up. Then boards are used for the bottom of the bench, and may readily be replaced.

Heating the Greenhouse

If hot water or steam is used in the dwelling house, the heating of the small greenhouse is an easy matter. Where a hot-air system is used for the house, a small hot-water coil may be placed in the top of the fire-box, and connected with the heating pipes in the greenhouse. Two "coils" of pipe of five 1-inch returns each, fed by two 1½-inch flows, would heat a lean-to, like that described, with hot water. The boiler should be placed as much lower than the piping as is practical—an advantage already at hand when the greenhouse is heated from the house cellar. For the detached small greenhouse it is usually possible, if one will look around a bit, to pick up a small secondhand hot-water heater, and secondhand pipe, which, while not as neat and trim as new material would be, will give satisfaction as far as supplying heat is concerned. The heating system should be installed under the direction of some competent person. A small house, especially if it is to be used only for starting plants in the spring, may be heated by a flue, although this method is not so reliable as hot water. In case a flue is used, the chimney should be built *on top* of the furnace. The flue should then be carried to the other end of the house, or near it, and back to the chimney. This provides a forced draft, as the air in the chimney is heated as soon as the fire is started, and sucks the hot air from the fire-box around through the flue after it. If a flue is used, care must be taken not to have any woodwork come in direct contact.

September : First Week

LATE WORK IN THE VEGETABLE GARDEN: LAST PLANTINGS; GETTING READY FOR THE FIRST FROSTS; PREPARING FOR WINTER WORK UNDER GLASS

The first rule for the home gardener at this time of the year is to let not a single weed go to seed. Do not let the weeds even form seed pods, because many of these will ripen and shell out if they are cut when green. Go over the grounds from one border line to the other; even in gardens that are kept clean, weeds at the ends of the rows, along the fences, or in plots that have gone by, often are left to be cut and burned in the fall—too late to prevent their sowing trouble for next year.

One reason, perhaps, why stray weeds are left is that among the usual garden tools there is none especially adapted to their removal. Weeds should be cut below the surface, to prevent their sprouting again. The hook-bladed knife used for thinning cane-fruits is ideal for this purpose. If one of these is not available, however, a tool for this purpose may easily be made from a piece of hoe blade or a mowing-machine knife blade. Cut the piece of hoe blade three inches or so wide, heat it and hammer it out straight at the shank; attach this to a stout handle four or five feet long in such a way that it can be used with a straight thrust. The mowing-machine knife blade may be fastened to a handle in the same way, or in such position that the cutting edge is uppermost, so it will cut with a pull. With either of these implements the removal of large weeds is not hard work. You do not need to stoop over, and no vegetables or flowers need be uprooted in the process.

All the refuse of vegetable crops such as peas, beans, early cucumbers, cabbage stumps, and so forth, should be

removed, put in a pile and burned clean as soon as it is dry. This may seem like a waste of vegetable matter that could have been added to the compost heap, but the eggs, cocoons and pupæ of various insects, hibernating adults, and the germs of various blights and fungous diseases are carried over and protected in material of this kind, to be on hand to make trouble next season. Thorough cleanliness is essential in fighting insects and diseases.

Fall Sowing for Spring Crops

The only sowing that may be done at this time of the year in the Northern States is a last planting of radishes. In states a little farther south, where killing frost need not be expected until late in October, there may be last sowings of early varieties of peas, spinach, beets and lettuce. Preparation should also be made now for onions and spinach to be wintered over. Onions should be sown considerably thicker than in spring, as some may be winter-killed. One of the early Globe varieties, such as Yellow Strasburg or Danvers, should be selected, as these make thick stands and are ready for eating earlier than the flat sorts. Although seed onions that have a good start and are protected by a winter mulch will stand very severe weather, the Egyptian or Perennial Tree onions are still hardier and are sure to prove successful with the amateur. They come in clusters of miniature onions—the heads that form at the tops of the seed stalks instead of seeds on this variety—which should be separated and planted in the same way as sets. They should be pushed deep into the soil, as the more the stalks are blanched the better they are for eating green.

A number of other vegetables may be sown late in the fall for extra early results next spring, but these should be put in so late that they will *not sprout this fall*. Radishes, lettuce, spinach, carrots, smooth peas, turnips and cabbage will usually come through all right and start up in spring earlier than any that could be planted then. The ground

may be prepared at any time, but the seeds should not be put in until just before you have reason to expect things to freeze up for the winter. Only a few cents' worth of seed will be required, and if you have to replant in the spring little is lost.

Late Spraying and Cultivating

Routine work among the late fall crops should not be neglected because the season is drawing to a close. Any that are subject to late attack from blight or mildew diseases, such as potatoes, celery or fall strawberries, should be sprayed carefully until they are ready for harvest.

Use the wheel hoe—or the hand scuffle hoe when the tops have grown too much to permit the use of the wheel hoe—as long as possible, especially if the weather is dry; a few leaves broken off beets, carrots, turnips or parsnips will make no difference. Late planted crops make their greatest growth, and consequently their greatest demand upon soil moisture, during the last two weeks before hard frost comes.

"Preparedness" for the First Frosts

It is still too early to put any vegetables into winter quarters, but a number of things must receive preliminary treatment as soon as they are ready. A sudden cold night may kill all tender vegetables, such as beans, squashes, melons and tomatoes, in latitudes north of New York City, at any time after the fifteenth of September. This first frost is often followed by a number of weeks of good growing weather, but do not be caught off your guard. To be on the safe side winter squashes, sugar pumpkins and melons, which are matured even if not quite ripe, should be gathered and placed in small piles so that they can be covered quickly if occasion arises. The less-matured fruits can be left to grow a while longer.

The ends of the vines, a few joints beyond the last fruits that give promise of becoming large enough to be used, should be cut off, and all the fruits belonging to a single hill

gathered together in one spot while still attached to the vines, so they may be covered easily. The greatest care should be taken in handling all these things, whether they are left on the vines or not. In removing them cut a piece of the vine with each; if the stem is knocked off decay is almost certain to set in.

Most beans can be used either dry or canned green. Just before frost is to be expected pick all immature beans for canning. The dried beans, of course, will not be injured by freezing, but as soon as the foliage has been killed they should be pulled and put under cover.

Though a light frost might blacken the foliage without spoiling the tomatoes, there is a chance of their being turned soft on the upper side. The largest fruits should be gathered and put away in a cold-frame in straw or marsh hay. The vines of smaller fruits can be left for a while longer. When one is pretty certain that a killing frost is coming, a few vines should be taken up, roots and all, and hung up in a dry place under cover or in the cellar, the sap in the vines being sufficient for the requirements of fruits that have nearly matured. In this way ripe tomatoes may be enjoyed for some weeks after the supply in the garden has been killed off.

Though onions are not likely to be damaged by early frost they may be made almost worthless by rainy weather, which will cause them to sprout again after the tops have become dry. As soon as they begin to ripen, as will be indicated by the tops' breaking at the neck and beginning to shrivel, the roots dry up so they can be pulled with very little effort.

At this stage no time should be lost in getting them out of the ground. If there is not room to give them storage in a shallow layer two or three inches deep, in a dry place under cover, pile them in windrows, putting four or five rows together. They should be raked over every day with a wooden rake until any soil has fallen off and the tops have become dry. Then get them under cover.

White onions should be pulled as soon as the tops break

over, and should immediately be put under cover; otherwise they turn green. Most of the white varieties are ready to pull some time before the yellow sorts.

Cauliflower, Brussels sprouts, Cos lettuce and endive all require attention as they begin to mature. As soon as the buttons or heads of cauliflower form, they should be protected from sun and rain by tying or fastening the leaves together at the tops. Brussels sprouts will fill up better to the top of the stalks if the heads of the plants are cut out after the sprouts have formed. Most varieties of Cos lettuce require tying to bleach thoroughly; use raffia or soft twine, and tie as near the top of the head as possible. Endive may be either tied up or bleached with two wide boards set ^-shaped over the rows.

Prepare for the Winter's Work Under Glass

It is time to begin preparations for the winter garden in the frames or greenhouse. If you have not a greenhouse already there is time during the next six or eight weeks to build one and to get your tenderer flowers into it in time to give your old enemy Jack Frost the slip. Nothing connected with gardening has changed more during the last ten or fifteen years than methods of greenhouse construction, particularly for small, inexpensive, practical-purpose houses. A house of almost any desired shape or width can be bought in standard units, or sections, which you can put together with little trouble.

If the compost for winter has not already been made, ample supplies of soil, well-rotted manure, sand, chip dirt or leaf mold, and rotted sod should be gathered together and put under cover. The soil in the frames, which may have become more or less weedy or dried out through the latter part of the summer, should be put into shape some time before you are to use it. In the greenhouse it is well to let the soil in the benches or beds dry out thoroughly a few weeks before putting them in use again. A thorough sun baking gets rid of some insects and disease germs.

September: Second Week

FALL BULBS: PLAN NOW TO SECURE A LONG SEASON OF BLOOM NEXT SPRING; TYPES AND VARIETIES

Bulbs to plant this fall, which will bloom next spring, require very small outlay. A few dollars will buy 200 or 300 bulbs of the best-named sorts, and most of these will last, or self-propagate, for many years. They are easier to plant than either seeds or growing plants, and if a few simple precautions are followed success is almost certain.

We hear a good deal these days about succession crops—follow-up crops in the vegetable garden and continuity of bloom in the flower garden. Very little attention, however, has been paid to obtaining a succession of bloom in the bulb garden. The spring-blooming bulbs are popular, but they would be much more so if more people realized that their season can, by proper selection, be extended from very early in the spring—much earlier than any of the perennials begin to bloom or than is safe to set out plants in flower from indoors—all through the spring and into early summer. In fact, their season may be extended practically throughout the summer if one includes the hardy lilies; but these are not, of course, covered in the term “spring-flowering” bulbs, and, moreover, most of them require treatment rather different from the latter. In describing how proper selection may prolong the flowering season in the bulb garden, I have given more consideration to the three most popular and important of the spring-blooming bulbs—tulips, narcissi and hyacinths.

Aside from the fact that, as ordinarily planted, the flowering season of the spring bulbs is unfortunately short, almost every point that one can think of is in their favor; especially so for the use of the person whose garden time as

well as garden space is limited. The culture is the easiest imaginable: buy good bulbs, plant them properly, give them a light winter mulching, remove it in the spring—and success is yours. The reason for this is that the buyer of a bulb is getting what is practically a “finished product”; all he has to do, so to speak, is to open the can and warm the contents, and it is ready for use. With a seed or a plant or even a shrub, however, he has got to do some real gardening. And the reason lies in the fact that the industrious Hollander or Frenchman or Jap who grew the bulb has done the real work with it; the flower is contained inside, literally a perfect miniature already formed, needing only the proper application of the sufficient degree of moisture and heat and sunshine to swell it to its mature proportions and to tint it to the most delicate or dazzling of colors. That is why, for example, you can grow a lily bulb in pebbles and plain water. For the amateur, success with the spring flowering bulbs is more certain than any other class of flowers. As already stated, their culture is the simplest; furthermore, they are practically free from insect pests and diseases, more so than any other class, not even excepting shrubs; finally they escape that greatest of all garden plagues—the midsummer drought. When your other choice flowers are drying up or necessitating the daily use of the hose and the constant maintenance of a dust mulch, your bulbs are lying dry and dormant, “resting up” for the autumnal root growth and the spring flowering period, at both of which seasons moisture is usually abundant. Nor is their cost excessive: the most beautiful of the narcissi for planting in mass or naturalizing can be purchased for from half a cent to a cent and a half apiece. Nor, again, is the fact that their cheery blossoms come at a season when practically no other flowers are in bloom, to be overlooked.

Plan Your Bulb Garden Before You Order

Before making out your bulb order, even though you take pains to select varieties that will give you a long season

of bloom, careful consideration should be given the method in which the bulbs are to be used. There are three quite distinct general methods of planting: in formal or designed beds; in informal beds or in long borders, and in naturalizing either in single specimens or small groups, or in large colonies. A great change in the method of planting has taken place during the last decade or two—a change that proves a boon to the gardener. In passing it may be noted that formal beds are no longer popular save in certain locations, and the bad reputation bulbs had in regard to their short blooming season was due mainly to the fact that when used for bedding or designs, as they formerly were, the gardener had to select sorts that would be as uniform as possible in time of flowering, height, color and in habit of growth. It is rather interesting to note, too, that whereas the hyacinth formerly occupied the chief position among these spring blooming bulbs, since they met these conditions most satisfactorily, this state of things is being reversed and tulips and narcissi are being given more and more prominence. Practically every fall catalogue now emphasizes and makes a special feature of Darwin tulips. Formal beds, and especially those laid out on the lawn to display geometrical designs, are, it is a pleasure to note, growing out of favor. In these days one seldom sees the old-fashioned anchor, ship or cartwheel that used to mar the appearance of an otherwise pretty front lawn. Such abortions never did have any practical or artistic *raison d'être*, although the legitimate, formal bed still has its place, either in the laying out of formal grounds or to supply a mass of color as part of some landscape scheme.

I would urge most emphatically that the bulb buyer get over his habit of sending in an order for Collection A or Collection B to “be planted according to the diagram herewith.” Don’t be tempted into buying a collection of bulbs just because, for the same money, you get a dozen or two more than you would by making your own collection of named varieties. What you are looking for for your money is not the largest number of bulbs, but the most satisfactory

and longest display of flowers, and this is only accomplished by making your own collection for planting an informal bed or border, or by naturalizing them, or, better still, by using both methods.

Figuring Out the Number of Bulbs Needed

To select and plan for a long season of bloom, first measure your bed or border and see how many bulbs of the required variety it will take to fill it. Hyacinths and the late flowering tulips should be set six to ten inches apart each way; the smaller earlier flowering tulips and Dutch Roman or miniature hyacinths a little closer, say five to eight inches. The various narcissi should be put from six to twelve inches apart, depending on variety and size of bulb, for full effect the first season. The narcissi, however, multiply very rapidly. From a few dozen bulbs you can, in the course of three or four years, get enough to make further plantings or to fill in a good deal of space, if, in the first place, they are set rather far apart.

Naturalizing is simply getting as natural an effect as possible. The simplest way is to get a sufficient number of the bulbs of the flowers you want, scatter them thinly broadcast, and plant where they fall. For this purpose, of course, only plants are used which are perfectly hardy and will increase themselves from year to year; therefore, perfectly satisfactory results can be had by using bulbs that are not all of the first size. For instance, if you get a third of the quantity in first size bulbs and the rest in smaller, you will have a good show the first year after planting and plenty of other bulbs coming on for succeeding years.

Having then determined the number of bulbs you will require, there remains the problem of selecting those which will give the best satisfaction.

Early and Late Tulips

I mention the tulips first, for they are at this time probably the most popular of all the spring flowering bulbs.

There are three main classes or sections: the Early Flowering sorts, single or double; the May Flowering or Cottage Garden, and the Darwin type, which also flowers in May. The other classes that are not so important are the Paris or Dragon tulips, which are good, strong growers and are beautifully colored with fringed and grotesque shaped flowers, and the class known as the Breeder tulip, from which the Darwins have been selected and developed. In size, season of bloom, robustness of growth, etc., these are similar to the Darwins; the reason ~~for~~ ^{that} their having dropped out of the public eye is doubtless that their dull, solid "self colors" were not popular for bedding effects. Some catalogues do not list them, but I can assure you that it will be very worth while for you to find one that does and to try out a few varieties.

The time of flowering depends upon variety as well as type; therefore, for the longest flowering season for tulips, pick from the earliest of the single and double early flowering several of the late and mediums of both the Cottage Garden and the Darwin types, and a few of the extra late of the latter. Some of the best extra-early singles are Kaiser Kroon, scarlet, edged with yellow; Prosperine, Sir Thomas Lipton, Vermillion Brilliant and White Swan. In the May Flowering, Darwin and Parrot sections are many splendid new varieties, which are described in the catalogues.

Narcissi, Daffodils and Jonquils

Of the narcissi there are also a number of different types, all more or less confused under the names given them in the trade. The most important class is the Giant Trumpet narcissus. This includes such popular and splendid sorts as Emperor, Glory of Leiden, "the king of daffodils," and the new giant flowered King Alfred, which has attracted a great deal of attention at the flower show.

In addition is the Medium Trumpet class, which is listed under such various catalogue names as "Star," "Crown," "Chalice-cup" and "Peerless" narcissi. This class includes

Barrii Conspicuous, one of the most beautiful of all narcissi and especially valuable for cutting, and the several fine Incomparabilis and Leedsii varieties.

The Polyanthus, "Cluster-flowered," or "Nosegay" narcissi are different from the foregoing in that the flowers are borne in clusters and are also deservedly popular on account of their pleasant fragrance. Paper White Grandiflorus, which is a favorite cut flower of the florists, and the "Chinese Sacred Lily," which everyone has seen growing in bowls of water and pebbles, are the two best known of this class, but a number of the others are equally fragrant and beautiful and should be tried. This class is not as hardy as the others, but you should order a few of them along with your bulbs for outdoor planting, to grow in the house during the winter, either in bowls of pebbles and water, or in pots or bulb-pans of light, rich soil. Most of them will come through all right outdoors, although they must have adequate winter protection.

The double-flowering sorts of daffodils are distinct from all the foregoing in having their flowers conspicuously double, which gives them an entirely different appearance. Of this class Van Scion, the old-fashioned favorite Dutch daffodil, is the best known. Sulphur (or Silver) Phoenix is dull white with a pale yellow center and is the largest and finest of the double sorts.

The double Poet's narcissus, *Alba Plena Odorata*, is also exceptionally beautiful and sweet scented, but it requires for its successful culture rather heavy soil and a partially shaded position.

Jonquils might be termed miniature narcissi, the whole plant being smaller, but with an exceptionally graceful and attractive habit of growth. *Campanelle Rugulosus* is the largest and strongest growing of these, and is very fragrant.

The Poet's type of narcissus has flowers that are white and much simpler in construction than the others, the petals expanding flat open or even reflexed. Instead of the "trumpet" they have a shallow cup, usually golden in

color, distinctly margined with some sharply contrasting tint, such as red or scarlet. *Poeticus Ornatus* and King Edward VII are improved forms of the type, but they flower earlier, and for a succession of bloom you should plant with them some of the old Pheasant's Eye, or original *Poeticus*. The Poet's type is the most recent addition to the family, the result of a cross between the *Poeticus* and *Polyanthus* types, and is sometimes called the Hardy Cluster-flowered Daffodil, in contradistinction to the semi-hardy *Polyanthus* type. The several splendid varieties of this new section are all robust, healthy growers, with *Poeticus*-like flowers borne in clusters on strong, stiff stems.

For a succession of narcissi of the several types mentioned, here are some of the best for early, medium and late blooming: Early—Trumpet Major, Golden Spur, Princeps, Henry Irving, Beethoven, Stella (*Incomparabilis*); for medium—Glory of Leiden, Emperor, Empress, most of the *Incomparabilis* and the *Leedsii* sorts, *Burbidgeii*, *Poeticus Grandiflorus* and Alsace (*Poeta*); for late—*Conspicuus Barii*, the single Jonquils, the other *Poeta* varieties, *Poeticus*, *P. Ornatus*, and P. King Edward VII.

Hyacinths for Succession

The matter of making out your hyacinth order is much simpler. For outdoor culture there are only two types, the single and double Dutch hyacinths in various colors, although the same varieties in smaller bulbs are to be had under the name of Dutch Roman or Miniature hyacinths. Many catalogues now list the named varieties classified as to color, so that the selection of those adapted to your special needs is an easy matter.

For a succession of hyacinths, here are a few of the best standard-named varieties:

EARLY—Baroness Van Thull, L'Innocence, white; Schotel, blue; Garibaldi, red; Moreno, *Rosea maxima*, pink.

MEDIUM—La Grandesse, Madame Van der Hoop, white; Czar Peter, Grant Maitre, La Payrouse, blue; Aoi des

Belges, Robert Steiger, red; Jacques, Gertrude, pink; Yellow Hammer, Ida, yellow.

LATE—La Franchise, white; King of Blues, blue; King of Yellows, yellow; Etna, dark rose; Queen of the Pink, pink.

Almost all above are old standard single sorts; the new named sorts show improvement in size and color.

It is advisable to make out your order for bulbs as early as possible. Orders are filled in rotation, as the supplies arrive—practically all the spring-blooming bulbs are imported—and if there is a shortage the late buyers are the ones who have to accept substitutes or go without. Planting should not be done too early, but it is always advisable to have the bulbs on hand so that they can be put in at once when conditions appear favorable. The object is to get a good root growth without having the tops start.

It is a great mistake, however, to send in an order before you have taken the time carefully to figure out your needs. As a general rule, you will get more satisfaction for your money by avoiding ready-mixed collections and varieties about which you know nothing except that they are low priced. Estimate carefully the amount of space you can devote to bulbs, keeping in mind that all the spring-flowering sorts may be used in a double-flowering system, with annuals or bedding plants set out in late spring in the bulb beds. Or the bulbs may be put in the rose bed, or the hardy border, to bloom early and be out of the way.

As to the proportion of each kind of bulb to order, that is a question both for personal taste and for the results which are aimed at. For design beds and formal effects, hyacinths are the most reliable for uniformity in height, color and time of blooming. Fortunately, however, design beds, disfiguring the otherwise pretty lawns of small places, are less frequently seen than they were a few years ago.

Tulips, through the development of many splendid new varieties that have increased season of bloom and range of colors, particularly in the more artistic and delicate shades, have gained greatly in popularity during the last decade. Many of the new sorts are fine for cut flowers, as well as

useful for all kinds of gardening—solid beds or borders, lines of color against the house, or scattered groups to lighten up the shrubbery borders.

Small groups of even a dozen or so Darwin or Dutch Breeder tulips, with their enormous blossoms borne on stems two to three feet tall, and remaining in flower for several weeks, make a striking display. Tulips should be replanted every second or third year, but this is easily done.

The narcissus group, which includes the jonquils and daffodils, is especially suited for naturalizing or for planting in irregular groups on the lawn, in semishady positions, to propagate and look after themselves. I know of plantings of narcissus that have not been disturbed for twenty years, but that still bloom freely. For the best blossoms, however, the bulbs should be separated every four or five years.

For flowers in the lawn, where the grass must be cut early in spring, the smaller earliest-flowering bulbs, such as crocuses, squills, snowdrops and chionodoxas, should be selected because they are hardy, and bloom early and never grow tall. Even with these the foliage should be allowed to remain as long as possible before cutting, so the bulbs will have every possible chance to ripen naturally.

September: Third Week

FALL PLANTING OF SHRUBS AND OTHER ORNAMENTALS: WHEN TO PLANT; PREPARATION OF SOIL; TREATMENT ON RECEIPT; PRUNING

The planting of hardy shrubs and perennials which are not subject to winter injury presents the greatest opportunity for constructive work at this season of the year.

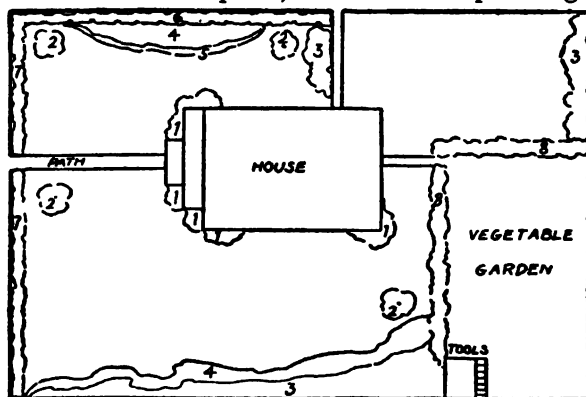
There are two good reasons why it is advisable to do this work now: The first is that such plants, if set out now, will have from two to four months' more growth before encountering the usual summer drought than they would if set out next spring—and during the first year after planting dry weather is the biggest source of loss, even though the planting is properly done. In the second place, this work if deferred until spring is apt to be put off until quite late or postponed altogether, because there are so many other things insistently demanding attention at that busy season. Moreover, with many plants, especially those blooming during the spring and early summer, a whole year is gained by planting now, instead of waiting a few months until spring.

In fall planting, as in spring planting, there is no set rule as to the best time to plant that can be applied to everything and to every season. "The earlier the better" is a slogan that can be quite generally adopted for fall planting. In seasons when the ground is very dry from a prolonged summer drought it may be advisable to wait until the fall rains begin, but even then, unless planting is to be undertaken on a very large scale, water can be given at the time of transplanting, and if necessary two or three times thereafter, to carry the plants through until the fall rains come. The extra time gained, even if it is but a week or so, is important, because the more firmly the roots become estab-

lished before freezing weather the more certain is the success of the planting.

When to Plant Shrubs

The ornamental shrubs comprise the most important group of plants for setting out in the fall. The proper time for planting is just after the first hard frosts—from the middle of September to the middle of November, according to the latitude and location. But if you wait until the hard frost comes before making your preparations and before engaging your stock you will be too late. Like the evergreens, the shrubs when once planted will become permanent features of the place, and the task of planning where



Fall planting. 1, Dwarf evergreens. 2, Large individual shrubs. 3, Tall shrubs for backgrounds and screening. 4, Lower shrubs for foregrounds. 5, Low shrubs or bulbs for edge of planting. 6, Tall informal hedge and street screen. 7, Formal or semi-formal hedge along street. 8, Tall, dense evergreen hedge and windbreak north and west of vegetable garden.

they are to go should not be done in a hurry. Shrubs with ornamental foliage and with colored berries and bark are just as beautiful as those which flower. Moreover, they serve to brighten the landscape during fall and winter when the deciduous flowering shrubs have lost their beauty.

There is no "best way" of using shrubs; they are available for all sorts of purposes—hedges, windbreaks, screens, masses, low and tall borders, single ornamental specimens, and for everything between the stiff formality of the closely

clipped boxwood or privet hedge to the naturalistic abandon of a mixed border planted against a wall or a boundary line with every appearance of having grown there as naturally as the weeds by the roadside.

Shrubs can be bought at from fifteen to fifty cents apiece, the majority of them for not over a quarter, so that a few dollars a year invested in them will soon make a representative collection. Even if only a few shrubs are set out, care should be taken to select those that bloom at different seasons of the year. With half a dozen, flowers can be had practically throughout the summer and early fall. In estimating the number of shrubs required for a bed or border of a given size allow about five feet each way for the taller sorts and three for the lower. A good principle to keep in mind, either in making groups or in placing individual specimens, is to maintain what landscape architects call the "open center." Do not set the plants indiscriminately here and there, breaking up the lawn and abruptly terminating views from the front porch, veranda, windows or other frequented places. Keep the shrubbery plantings rather at the outer margins and be careful to use low-growing shrubs where some nearby attraction or distant vista would otherwise be shut off.

Preparation for Planting Important

As a rule, shrubs are not particular in regard to soil, but it is highly important that the best possible preparation should be given. And as several years' supply of nourishment is to be incorporated a generous supply of coarse ground bone and acid phosphate, as well as some potash, should be included with the manure to be dug into the soil. For the shrub border the whole space to be planted should be plowed or dug. Where individual specimens or small groups are to go the ground may be prepared by digging out and enriching holes of suitable size. Where a hard subsoil is encountered it may be advisable to loosen it with dynamite.

The manure should be worked well down below the surface; a couple of good forkfuls and two or three handfuls of a mixture of bone, acid phosphate and potash to each shrub will not be too much. The sooner the ground can be got ready the better. An interval between its preparation and the actual planting gives it a chance to settle, and the various fertilizers used will be in more available form for the newly set plants to appropriate.

Pack the Soil Firmly about the Roots

From the nursery, properly grown plants will be received with a mass of fibrous roots carefully wrapped in burlap to keep them moist and in good growing condition. If the packing is dry when they arrive they should be placed, packing and all, in a tub, and water applied slowly until no more will be absorbed. Put in only a little water at a time; do not soak the whole mass. It is advisable to plant as soon as possible after they are received; but if for any reason they must be held for a few days keep under cover and out of the wind. Or if planting must be delayed for a week or so cut the bundles open, take out the individual plants and heel them in in a trench.

Firm planting is of the greatest importance, because even if a favorable fall is encountered the plants will not be very firmly established by winter, and damage from strong winds or from the heaving of the soil is pretty sure to result unless the earth has been packed round the roots solidly enough so that there is no "give" to the plants.

In planting do not expose the roots even for a few minutes to wind and sun. The most convenient method is to carry the plants in a large, shallow basket, keeping the roots covered with moist burlap. Any broken or bruised roots should be cut back to clean, hard wood. Deciduous trees and shrubs which flower after midsummer should be well cut back after planting. The early flowering sorts have already formed their buds, and pruning means fewer flowers the first spring; but if many of the roots have been removed,

so that there seems to be too much top in proportion, it is best to sacrifice part of this first crop of flowers to make more certain of the ultimate success of the plant.

If water must be applied put it in the bottom of the hole, before the plant is set, and again after it is about half filled with earth; never pour the water on top of the soil. See that the soil is well pressed in about the roots as the hole is being filled. Do not fill the hole up level and then make it firm by pressing on the top. The top inch or two of soil should be left loose to act as a mulch. Most shrubs should be set slightly deeper than they were growing at the nursery. Tall specimens which appear the least bit wabbly should be immediately staked and tied with bits of soft cloth or fastened with pieces of old rubber hose to prevent injury from the wind.

September: Fourth Week

PERENNIALS FOR PLANTING AND RE-PLANTING THIS FALL: PHLOX, IRIS, PEONIES

Most perennials can be planted in the fall with advantage, because there is more time to do the work, and they will get a stronger and much earlier start, than would be possible by spring planting. The spring blooming perennials, in fact, must be planted in the fall if one would be certain of results the first year. In addition to new beds to be made, or new plants added to one's collection, there are quite sure to be a number of perennials which should be taken up, separated, and replanted, to continue to give the best results. Both those which form new "crowns," like Golden Glow (*rudbeckia*), *helianthus*, *Physostegia*, and others similar, and those which propagate by making increasingly larger clumps, such as phlox, hibiscus, iris, and others of similar growth, gradually exhaust the plant food and overcrowd, reaching a point, after several seasons' growth, where they will deteriorate rapidly unless separated and replanted; preferably they should be given fresh soil, although replanting in the same place, after the ground has been thoroughly dug and enriched, will renew their vigor and size.

As all of this work will more or less upset the garden it is best to delay it until after the first killing frosts. New beds or borders, however, should be made in the meantime. They should be trenched to a depth of some two feet. Natural drainage should be good, and the beds so located that no surface water will stand on them during the winter. As the plants are to remain for several years, the soil can hardly be made too rich, and plenty of coarse ground bone should be used in addition to the manure or compost employed, as this will decay gradually and continues to furnish an even supply of plant food for several years.

Do the Fall Planting Early

Unless a late dry summer has made soil conditions unfavorable, early planting is, generally, advisable; there may be dry weather later, or an extra early fall. Most of the plants may be safely handled soon after their blooming season is over, especially such sorts as go into a semi-dormant state of growth, as indicated by their foliage turning brown or dying down altogether. Therefore the early flowering things should be moved first, Bleeding Heart (*Dicentra*), the early phloxes and hardy poppies, lily-of-the-valley, primroses, and many others can all be planted immediately. Hardy perennial plants which are bought from the nursery or seedsmen, and have been grown in pots, may also be set out immediately, and the sooner they are set out, the stronger plants they will make before winter. The things still in active growth, like the late phloxes, chrysanthemums, fall anemones, helianthus, cardinal flowers, Tritomas, can wait until they are through flowering or after hard frost. In ordering from a nursery, the proper time for sending the plants may be left to the grower, but if a considerable number of things are being bought it is well to have them sent in two lots,—the earlier things a couple of weeks in advance of the others. This will be better for the plants, and the work of planting will not have to be so rushed.

Increasing Plants by "Division"

In replanting your own plants or in exchanging plants with your neighbors,—which is a good and inexpensive way of increasing your collection,—the plants should be kept out of the ground as short a time as possible, and at all times should be protected by moss or wet bagging from sun and wind. There are two common mistakes to be avoided. The first is leaving the clumps to be replanted too large; most perennials can be divided easily by hand, and part of a clump or a section of a plant with a few strong buds or crowns, will give much better results in almost all cases than

a large clump or several pieces of roots together. The other mistake is, with such an abundance of material on hand as one will have in taking plants up from an old border, that the plants will be reset too close. Give them plenty of room. In most cases, the average height of the plant will not be too great for the distance apart to set them. All tall growing things such as Aquilegias, Delphiniums, Digitalis, and so forth may be set closer in proportion to their height. In taking plants up, the lawn edger, which should be well sharpened, is very much better for cutting around the plants than the spade; and also for cutting up things which make dense clumps, and are not readily separated by hand, such as phlox. Some of the other good perennials which may be set now, include columbine (Aquilegias); Dictamnus (Gas plant); Hardy Daisies; Hardy Pinks; Liatris; Lychnis; Sweet William; Veronica. Some perennials especially good for shady positions are Aconitum; Anemones; Anchusa (Alkanet); Hepatica; Primroses; Polyanthus; Ranunculus; Saxafrages; Trillium; Vinca; hardy Violets.

Selecting Phlox for a Long Season of Bloom

The most important of all our American hardy perennials and, in the opinion of many, the most indispensable of all perennials for the hardy border, are the members of the phlox family. By careful selection of the varieties from the different species, they may be had in bloom continually from quite early in the season until frost. There is a wide range of colors, practical freedom from diseases or insect enemies, and the flowers of many varieties are fragrant. The earliest flowering varieties are of creeping habit. One of these is *phlox subulata*, which is very hardy and good for a ground cover, even under somewhat adverse conditions, provided only the soil is not too dry. The foliage is evergreen and somewhat resembles moss, giving it its common name of Moss or Mountain Pink. While the old variety of this, the one still most commonly seen, is of a jarring, purplish rose color, it may also be had in pure white, light rose and

pale lilac colors. *Phlox Douglasii* may be used successfully where the soil is too dry for the above. For shady places use *Divaricata*; while the plant itself is creeping in habit, the stems rise to a height of a foot or a foot and a half; it remains in flower throughout the early summer. There are two splendid new varieties of this, one dark blue and the other white, which make it still more valuable. The earliest of the upright phloxes come into bloom in May; among these are *Miss Lingard*, white with a dark colored eye; *Mrs. Dalrimple*, rosy white with scarlet eye, and *Ninon*, deep rosy lilac. Among the best of the standard summer flowering varieties are—of the pure white—*Mrs. Jenkins*; *Frau Anton Buchner*; *Jeanne d'Arc*, which come into bloom in the order mentioned and are especially good; *Frau Anton Buchner* has the largest individual flowers of any white sort. Among the brightest of the crimson and red sorts are *Tragedie*, brilliant carmine; *Coquelicot*, pure scarlet with crimson eye; *Henry Marcel*, red with bright salmon shading; *Siebold*, one of the best bright reds; *Vesuvius*, dazzling red with purple eye. Between these there is a wide range of colors, shading through lilac, light pink, mauve, magenta; *Elizabeth Campbell*, salmon pink with red eye; *Thor*, somewhat similar but darker color; *Gefion*, peach pink; *W. C. Egan*, a newer sort and one of the best both in vigor and color,—lilac with bright center—and with immense individual flowers; *Bridesmaid*, white with crimson eye; *Mme. Paul Dutrie*, soft lilac rose, extra large flowers and panicles; *Rynstrom*, carmine rose; *La Vague*, pure mauve. These are all splendid varieties but can be bought very reasonably, from fifteen to twenty-five cents each, or in collections at an average of little over the former figure. Your order for phloxes should also include some of the *Arendsi* type; this new race is entirely distinct,—of very vigorous, branching habit, only one to two feet high, coming into bloom between the early flowering tall sorts and those described above, and are more free-flowering than any others.

The late blooming phloxes will not be ready for re-setting until well into October, and may be set from then until

November; 18" apart is the proper distance for most varieties, and the taller or stronger growing can be given a little more. The old clumps should be cut up into separate pieces, containing several shoots only, using an edger or a very sharp spade. Do not be tempted to keep more plants than you have room for, even though you have to throw some away,—although there are generally friends available who would be very glad to use them in their gardens.

Planting and Replanting Peonies

Peonies can remain longer in one position without any necessity for replanting than most of the perennials. They are very hardy, free from insects, and usually from disease. The new peony disease has not become widespread and if the plants are bought from a nursery where one is sure that they are healthy, it is not likely to cause trouble. The plants are not particular as to soil; and the ordinary garden soil in which vegetables or flowers do well is all right, but one should be selected that is rather heavy, if it is available.

Although the flowering season is usually over early in July, the plants continue to grow for some time; the growth should be encouraged as it stores up energy in the fleshy roots for next season, in the same way as rhubarb or asparagus; but the foliage will have completed its growth and will begin to ripen off by the middle of September, and the sooner the plants are put in or replanted after that the better. As each root, although it may seem quite small when put in, will make a very large clump within the course of a very few years, they should be planted from two to three feet apart, and nearly that distance from other plants, where they are set in the hardy border. It is a good plan to set out some of the early, flowering spring bulbs near them in the border, as these are gone by before the peonies require the room. Care should be taken that the manure used is old and does not come into contact with the fleshy roots when setting the plants out. Very frequently the roots are set too deep. The crown of the root after covering should be only 2 to

2½" below the surface. While the peonies are sufficiently hardy to require no protection, the mulch which is applied to the mixed border will do no injury. And for the first season after planting, a mulch which may be of manure, is advisable, as it protects the soil from the heaving sometimes produced by alternate freezing and thawing. The peony is one of the grossest feeders of all the garden flowers and the soil can scarcely be made too rich before planting or too much manure or fertilizer used thereafter.

Twelve of the best varieties are Festiva Maxima, a giant white; Couronne d'Or, white with yellow and carmine; Duchesse de Nemours, sulphur white; Modeste Gurin, bright rose pink; Marie Lemoine, sulphur white, late blooming; Felix Crousse, brilliant red; Eugene Verdier, flesh pink; Delicatissima, delicate, light pink; Mons. Jules Elie, flesh pink; Madame Calot, early flowering pink; Mme. de Verneville, sulphur white with white center; La Tulipe, very large flower shading to white; and M. Krelage. A few plants also of the old *Peonia Officialis* should also be used as these bloom some two weeks earlier than the varieties named above.

The Iridescent, International Iris

One of the best old-fashioned garden flowers was the iris, or blue flag, or fleur-de-lis. The clumps of blue flags in the front yards of old farm homes always give a fine air of distinction.

These old-fashioned irises were mostly of the type known in the catalogues as German iris. There are literally thousands of varieties on the market, representing the newest and best fashions. In colors they show almost every shade of blue, yellow and red, with some pretty fair whites.

The blues are the best known and probably the most effective; but the yellows are also desirable. The reds are not so popularly distributed, but deserve much more general planting. They run mostly toward dull brownish and coppery shades, very rich and pleasing.

These German irises thrive in any good garden soil—

say a soil suited to potatoes or corn. They should be planted where they can be cultivated and where they need not be disturbed for several years.

The Japanese irises when properly grown are larger and finer than the German varieties. In color they are mostly blue or white. A common belief assigns them to swampy spots along the shores of ponds, but this is hardly correct. In fact, the plants will not live in a soil where water stands. The soil must be rich and moist but well drained. Fine Japanese irises may be grown in any garden where the soil is reasonably heavy and retentive.

The Iris, like the phloxes, must be carefully selected as to species in order to get the longest season of bloom possible. By a proper selection they can be had from early spring until past midsummer; the two most widely known species are the German Iris and the Japanese Iris,—*I. Germanica*, and *I. Kaempferi*, respectively; the former bloom the earlier, beginning to flower in May. A new species, *Iris Interregna*, blooms still earlier and the flowers are of fine form and of clear and distinct colors. The German Iris should be planted on well-drained soil, the roots slightly covered; they appreciate plenty of sun. The Japanese Iris, on the other hand, while succeeding in almost any soil, and in either sun or partial shade, require plenty of water, particularly while they are developing their flowers; all are quite readily replanted, but the Japanese sorts do not increase rapidly. In planning for a succession of bloom, either in the mixed border, or in the iris beds, plants of the following species will bloom about in the order named. *I. Pumila*, the "baby" iris; *Asiatica* and *Florentina*, old sorts, smaller, but earlier flowering than the new German sorts; *pumila hybrida*, and *interregna*, newer species,—of each of which there are several good varieties,—having German parentage, but blooming earlier; the regular German type, including such grand sorts as Madame Cherau, pure white with sky-blue edging, Pallida Dalmatica, lavender, with fall petals shaded blue, and very fragrant, Maori King, golden yellow with chocolate falls, Queen of May, old rose, Mrs. H. Darwin, white

with violet veining, King of Iris, yellow and brown, extra fine; the Siberian iris (*I. Sibirica*) including several good sorts, *orientalis* being the earliest, and one of the best, and Snow Queen, a new ivory white, a good companion to it; the Japanese iris, concluding the season's bloom, with a few stray blooms up to the end of July, the grandest of all, with the widest range of color and combinations, but the varieties are not as generally known by name because their Japanese nomenclature means little to American gardeners, and the unregulated re-naming of varieties which has taken place has resulted in much confusion, so that the most satisfactory way is to order from descriptions, or, where it is possible, personal inspection.

The "Spanish" and "English" irises are quite distinct from the above, and usually listed as "bulbs."

September: Fifth Week

BULBS FOR WINTER BLOOM: NARCISSI, HYACINTHS, AND TULIPS FOR FORCING; OTHER FLOWERING BULBS; CUTTINGS TO ROOT NOW

Of all the flowers available for indoor culture in the winter window garden, bulbs give the greatest assurance of success with the least trouble. Their requirements are the simplest; they are perhaps the cheeriest of all flowers; many of them are deliciously fragrant; their cost is trifling; and they may be had in a constant succession of bloom throughout the winter and early spring. In fact, with the proper facilities for storing them after planting, practically all the work for a whole winter's succession of flowers can be done in one afternoon; they are then simply taken from their winter quarters into warmth and light as required, with about as little trouble as it takes to get the day's supply of canned vegetables from the cellar shelf.

The cultural requirements of bulbs for winter bloom, although simple, are imperative. They may be mentioned in order as follows: Selection of suitable varieties; purchase of healthy, heavy bulbs; properly mixed soil; correct planting; development of root growth before forcing; a gradual start in forcing; and congenial conditions of light and temperature while growing and blooming.

A great variety of bulbs are forced commercially, some of which the amateur grower, particularly the beginner, will do best to omit. With the possible exception of the lily-of-the-valley, the bulbs which the commercial grower can force have no advantages over those available for the window garden. The latter include hyacinths, narcissi, tulips of some varieties, Easter lilies, freesias and gladioli.



PLATE 21.—Nothing adds more to the beauty of a place than a well made and well kept lawn. One of the difficult points in lawn making is to get an even distribution of the seed. The plan shown here is great help to the beginner. Mark the area to be sown out with strings or a tennis marker and sow a part at a time. The illustration at the right shows the method of topping or re-rooting a rubber plant which has grown too small. A ball of sphagnum moss is bound about the cut made at the desired point and kept continually moist until the roots from the cut part begin to show through, when the top is severed and potted up.

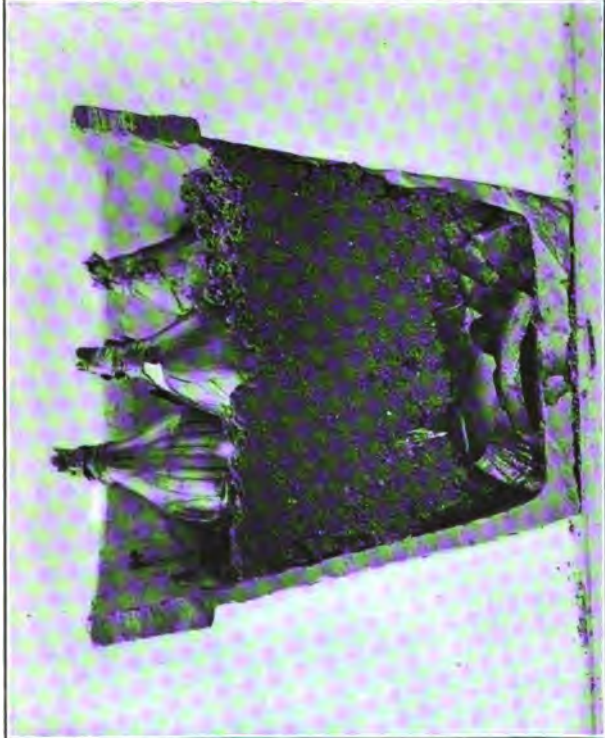
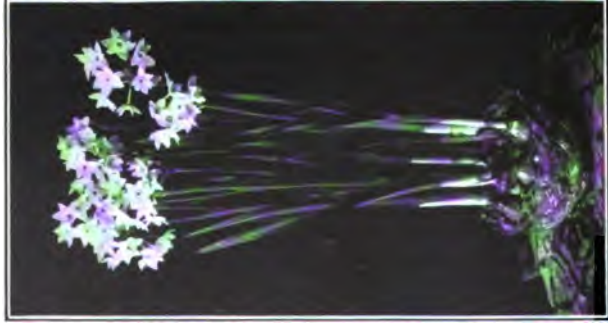


PLATE 22.—Some bulbs, like the Chinese Sacred Lily and a number of the narcissi and hyacinths bloom freely when grown in plain water, with pebbles to hold them in position. The cross section of a pot (*on the right*) shows the method of arranging crocking, soil and bulbs, for forcing.

Hyacinths for Forcing

Some of the best varieties of hyacinths for forcing are La Grandesse, and L'Innocence, and Madame Van der Hoop, (early) all pure white. Among the red shades are Baron Van Thuyll, Gertrude, Gigantea and Robert Steiger; City of Harlem, yellow, and King of the Yellows; and Czar Peter and Grand Maitre, light blue and deep blue respectively, and Queen of the Blues, make a dozen sorts, giving a good range of color. These are all large singles. The double sorts may be forced, but usually they do not give as satisfactory results, and to most people, are not nearly as attractive in appearance as the single sorts. A hyacinth at best is a stiff and artificial looking flower, but the double varieties are even more so than the single. The Roman hyacinths, are quite distinct from any of the above, and much more graceful, sending up many stalks from a blub. It is wonderfully fragrant. It is one of the easiest of all bulbs to force and is the earliest, flowering by Thanksgiving if started early in September. It may be had in pale pink and blue shades as well as in the white, but the latter is the universal favorite.

Narcissi and Tulips for Forcing

Among the Narcissi, the two that are the best known and should be found in succession throughout the winter in every window garden, are Paper White and the Chinese Sacred Lily; both are too well known to need description; the latter is universally grown in pebbles and water. The Paper White is usually forced in soil like the other bulbs, but will give equally good results and will come into bloom much sooner when treated in the same way as the sacred lily. Along with these should be mentioned the new Narcissus Poetaz Hybrids. This beautiful new race lends itself readily to forcing, either in pots or in pebbles. Of the "Trumpet" sorts, the Trumpet Major is one of the surest and earliest and may be had in flower by Christmas. Hors-

fieldii is another of the best and earliest. Others good for forcing are Princeps; Glory of Leiden; Emperor; Golden Spur; and Victoria. If these do not afford a sufficiently wide range of form and color, other new and old varieties may be drawn upon.

The tulips are not so well adapted to forcing as the hyacinths and narcissi but may be used with success. They are so decidedly different that, unless one is limited in the number of things which can be grown, at least a few will repay the trouble required. Early varieties should be selected, such as the Duc Van Tholls, in various colors, from the single early flowering section, and Kaiser Kroon, and Murillo from the double flowering; the May flowering sorts, planted at the same time, will flower a little later, and the Darwins will finish up the succession of bloom in March and April.

Bulbs should always be purchased only from a thoroughly reliable source. Almost always for forcing purposes, it is better to pay the price and get the largest there are to be had. These are usually listed as Mammoth, Jumbo or some other super-superlative term. "First size" bulbs will also give results. Very often, two or three smaller bulbs, planted together, will be very much more effective than a single large one, although the individual flowers may not be quite so big. Hyacinths cost from ten to twenty-five cents apiece; Roman hyacinths, from fifty to seventy-five cents a dozen; narcissi and tulips, from twenty-five to seventy-five cents a dozen; crocuses, from fifteen to twenty-five cents per dozen; freesias, twenty-five to fifty cents a dozen; gladioli, twenty-five to fifty cents a dozen, and Easter lilies, ten to forty cents apiece. When ordering, it is well to specify that bulbs are to be sent as soon as received. Tulips, and hyacinths and narcissi which are wanted for early flowering, should be started as soon as you can get them. Where you are buying the bulbs personally, select those of regular form, round and plump. If there is any choice between plumpness and size, the former will usually be the safer bet. Bulbs which have become slightly shrivelled in transportation, may

often be restored to good condition by placing them in slightly moist sawdust or moss in a shaded place. If this does not seem to restore them, it will be best not to risk planting them. All bulbs which are to be kept on hand for planting later, should be packed in sawdust in a box or wrapped in heavy paper away from the light and high temperature.

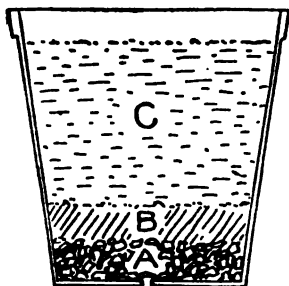
Soil for Forcing Bulbs

The most important thing about the soil for bulb forcing is to have it friable enough to drain rapidly and thoroughly. A mixture of garden loam, manure so old that it is thoroughly disintegrated (or manure and leaf mold mixed together, if only ordinary manure is to be had), and sand, will give the results sought. The two former may be mixed half and half, and enough sand be added so that it will crumble readily when moist. There will be little danger of getting too much sand, even if added in an amount equal to the soil. In case neither manure or leaf mold are to be had, a few thick sods taken up by the roadside and then shaved with a sharp spade or an old knife, mixed with sand and enriched with fine, ground bone, two quarts or so to the bushel, will answer the purpose. "Humus" also is excellent.

In planting, ordinary flower pots, "bulb pans," which are very shallow flower pots, or flats may be used. For general purposes, the bulb pans are the most satisfactory. The 6" size costs about seven cents, and the 10" about twenty cents apiece. If the flowers are to be used for cutting, or to be brought into a conservatory, the flats, which may be made in smaller sizes than those ordinarily used, are more convenient, as they hold more bulbs and do not dry out so quickly. Bulbs which have made their root growth in flats may be later planted in pots to be taken into the house, thus economizing space during the preliminary part of their growth.

Whatever is used in the way of a container, the essential things in plantings are to see that good drainage is

provided and that the bulbs are planted to a suitable depth for the kind being used. Sphagnum moss (B) excelsior, or screenings should be placed in the bottom of the flat, or a few pebbles or pieces of broken flower pot (A) put in the



bottoms of the pots or bulb pans, before planting. Then put in a layer of soil (C), on top of this place the bulbs, about a half inch to an inch and a half apart. After being placed, they should be covered in firmly. Hyacinths should be left about a half inch below the surface; tulips a little deeper, while the tops of the narcissi which are more elongated, will

often come up to the surface of the soil. A very thorough watering should be given after setting, and as soon as any surplus has had a chance to drain off, the flats, pots or pans should be set away to make root growth.

The Easter lily, unlike the other bulbs, forms roots on the base of the flower stalk as well as at the bottom of the bulb itself; for this reason, and also to give it as firm a support as possible, it should be planted well to the bottom of the pot and only partly covered at first, or else planted in a small pot and repotted again once or twice during the early stages of growth into larger pots, putting it well at the bottom each time, and filling it in about the stalk with new earth.

The Secret of Success

The "secret of success" with bulb culture, so far as there is one, is in getting a good, strong root growth before the tops are allowed to start. Darkness, low temperature and sufficient moisture to keep the soil from getting dry are the conditions required to achieve this result. Freezing later on, before they are taken into the house, will not hurt. But for convenience in getting at them they are usually kept in a cool cellar or in a dark closet, or in a cold-frame

or in a trench covered with litter and leaves enough to prevent hard freezing.

Before putting them away, every pot and flat should be carefully labelled. Don't trust to your memory!

If no cellar is available and you have not a cold-frame, dig a trench or a square with dirt sides some 12" to 18" deep, but large enough to accommodate your flats or pots or pans. They can then be placed in this in just the order in which you want to take them into the house, so that you can start at one end of the trench and remove them in order as required. Dry coal ashes make an excellent covering, or soil can be used. Either should be about 8" deep, and on the approach of freezing weather, leaves and litter enough to prevent freezing should be placed over this. Bulbs stored thus will need no further attention until time to bring them in. If they are kept in a cellar or in a closet they should be looked at occasionally and watered if the soil gets too dry; keeping them well covered with sphagnum moss will retard evaporation.

The most prolific source of failure with bulbs is in starting the tops before sufficient root growth has been made. The different kinds, and even the different varieties of the same kind, vary considerably in the time required for root development before they should be started. As a general rule, the longer they can be held back, the stronger the root development and the better flowers will be. Roman hyacinths and other early things that are wanted in bloom for a special time, such as Thanksgiving or Christmas, can be brought in after six or eight weeks. But tulips, and the later varieties of hyacinths and narcissus, will do better with ten or twelve weeks, so that the bulbs planted in the latter part of September or the first of October should not be taken in before December.

In removing the bulbs to the house, they should at first be given a temperature of only forty to fifty degrees and kept in a somewhat subdued light,—some room that is not much used, with a north window being an ideal place. They should be given a thorough watering and allowed to re-

main here for a week or so until they are well started. Then give them more heat or bring them into a warmer room so that they will have a temperature of fifty or sixty, and more light; but full sunlight is not good for the bulbs except for a few days just as the flowers are opening. Under the right conditions, the top growth will be very rapid and an abundance of water will be required. If the pots seem to dry out too quickly, it will be well to keep the saucers filled with water. Or the pots may be set in larger pots or pans and wet moss stuffed around them. A high temperature, dry air, or coal or illuminating gas, will prove fatal, blasting the buds even before they open. In addition to plenty of water, a watering with liquid manure or nitrate of soda, as the buds swell, will be found very beneficial.

Insects are not likely to prove troublesome, but if they do, they should be treated at once. Some tobacco dust sprinkled about the soil and at the base of the leaves will prove effective as a preventive. Plenty of fresh air should be given at all times,—the more the better, so long as the plants are not chilled. When the blooms do open, if the plants can be kept in a cooler temperature in a somewhat subdued light, they will last much longer.

Freesias and gladioli can be planted in much the same way as the bulbs which are mentioned above, but do not have to make preliminary root growth, although they should be kept cool for a few weeks after planting.

Cuttings to Root Now

Before danger of the first killing frost, make your first supply of cuttings of geraniums, heliotrope, verbenas and other tender perennials or annuals of which you will want plants for stock or for setting out early next spring. The directions as to how to make and root the cuttings are given elsewhere in this book. The cuttings can be rooted out of doors, if provision is made to give ample protection against the first hard frosts, which are almost always

followed by two or three weeks of good growing weather. Place the flats of sand in which the cuttings are to be rooted where they can be shaded, and cover, when necessary, with old bags or rugs,—in a frame, on the north side of a building, or in the shade of the veranda, are good places. Water the sand well before putting in the cuttings, and then give only enough to keep the sand thoroughly moist, not soaking wet. Pot up as soon as the roots are a quarter of an inch or so long.

October: First Week

HOT-BED AND COLD-FRAME GARDENING: EQUIPMENT; SOIL; HEATING; VARIETIES OF VEGETABLES FOR FORCING

The "frames"—the cold-frame and its artificially heated counterpart, the hot-bed—are ordinarily looked upon as a garden adjunct the main purpose of which is to get plants started a month or two earlier in the spring, so that certain crops in the garden may be forwarded to that extent. In this case the sash are used only for about three months in the year and lie idle for the rest of the time. But where one wishes to get the maximum results from his garden space and garden equipment, such half-efficient management should be changed, as the frames may be used to advantage for seven or eight months in the year instead of three. This is especially desirable where the garden space is limited, as it is in the great majority of suburban places; and, furthermore, it is not only a matter of having more garden produce than could otherwise be grown, but of having it at a season when it is especially valuable—such things as lettuce, radishes, green onions, and spinach, which you have usually not had before May and June, during the winter months; and such things as beans, cucumbers, muskmelons, etc., which ordinarily you do not have until well along toward the end of the season, during early summer.

In planning to make your frames a really important part of your garden operations, two things must be provided first of all—soil which is naturally thoroughly drained and will not become wet and soggy through the winter and early spring months, and an abundance of water to use in dry weather when it is needed. You must realize at the outset that cold-frame gardening is a highly intensified form of gardening, and that therefore to be successful with it you

must have the factors for success, of which water is, of course, a vitally important one, well under control. At the same time, it is just as well for you to realize that the returns from it on the basis of the amount of space allotted to it will be much higher than from any other part of your garden. For instance, outdoors you set your rows of lettuce twelve to fifteen inches apart and set out the heads or thin them to about twelve inches. In the cold-frames fifty heads are set to a space three by six feet (eight inches each way), from which space outside you would get eighteen or twenty heads.

Three Kinds of Sash

The equipment for intensive gardening of this sort is a little more diversified, but on the whole much less expensive than ordinarily supposed. You are probably familiar with the ordinary cold-frame—a box or frame with sides of wood covered with a standard glass sash (size three by six feet), and provided with a wooden shutter or a straw mat for covering in extreme cold weather. The equipment which I am going to recommend contains sash of three distinct sorts, each of the three especially valuable for its special use. In the first place, there are the double light sash; these cost a little more than the others, for they are made with a double layer of glass with an air space between them which, being an efficient non-conductor, answers the purpose of the mat or shutter in keeping out the cold, but with this great advantage, that at the same time it will let all the sunshine in. The double light sash is a distinct and valuable improvement in the way of garden equipment, and is proving wonderfully valuable to thousands of places. But it is when used to supplement sash of the ordinary kind rather than to take the place of them, that one gets the greatest amount of service from them. Because with the double light sash, where one has no greenhouse, seeds may be sown and the plants started and grown to a size large enough to transplant to the frame under the regular sash at a season when, under the old methods, you would just be starting them.

The standard sash, three feet by six in size (and preferably having three instead of four rows of glass, as more light is obtained) does not need any description here, as everyone is familiar with it; of these, one should have two or three times as many as of the double sash; and then there are the sash made with light wooden frames and covered with protecting cloth; these are not nearly so well known nor so largely used as they should be, but they will keep off several degrees of frost and for many uses will answer just as well, and in some cases even better than glass: and, furthermore, in severe weather they can be used in the place of mats or shutters over the glass sash.

The frames on which the sash are supported may be of inch boards and two by four inch uprights for holding these in place; the usual dimensions are two feet in back and a foot and a half in front, which gives a slope sufficient to carry all the rain water off the sash, and also catches the sunlight at a better angle. Frames which are to be used as hot-beds—that is, supplied with manure to give artificial heat in cold weather—should be made a foot or eighteen inches deeper on the inside. While the board frames may be banked up with earth on the outside, so as to be impervious to frost and cold wind, and, if substantially made, will last for a number of years, nevertheless, it is far better to go to a little more trouble and possibly a greater expense, and have the frames made of concrete. If you cannot have them all made this way, then those which are to be used as a hot-bed at least should be so constructed, as these are used for more months in the year and the rotting caused by the manure will cause them, if made of wood, to go to pieces more quickly than the ordinary cold-frames. A sill or cap of wood or iron—preferably the latter—may be bought to put on top of the concrete, and is so constructed that the sash will fit firmly on it.

The Cost of Equipment

The amount of garden stuff which can you get out of a limited space which is taken up by your frames is truly re-

markable; not only because the planting is done more closely in the frames, but because where several crops may be taken from it each season you would get one or two from the garden. A ten-sash frame used in connection with the regular garden would give an ample supply of winter and early spring vegetables to a good sized family, besides furnishing room to winter over such things as might be required and an ample supply of plants for the garden in the spring. For such a cold-frame garden a convenient division of the sash would be as follows: Two double light sash costing about \$7.00, four single light sash costing \$10.00, four cloth-covered sash costing \$2.00, three double-sized burlap mats costing \$3.00—a total of \$22.00.

In addition to this, the lumber for the frame would cost from \$5.00 to \$10.00, depending upon the price per thousand feet in your vicinity. The cost of a concrete frame instead of a wooden one would depend almost entirely upon the price you would have to pay for the sand and gravel, as the amount of cement used would not be very great. In most instances, unless you have the sand and gravel on your own place, the cost would be more than for wood, but as has already been stated, it would be much cheaper in the end. After the frame is put up two partitions should be built across it, to divide the spaces for the two double-light sash, the four single-light sash, and the cloth-covered sash. If the frame is a long one it should be strengthened by cross-bars every three or four sashes apart, to keep the side walls from warping out of position; or they may be put in every three feet even with the sash as described above. It is a great convenience, however, to have them removable.

Good Varieties for Frame Use

It is time to begin work now for the crops you will want this fall and this winter. The first step in this direction is the selection of varieties of vegetables which are good for growing in frames, as the use of the wrong sorts, even with other conditions all favorable, may mean failure in-

stead of success. In lettuce there is Grand Rapids for the loose heading sort and Big Boston and Wayahead, both of which make fine, solid crisp heads and will thrive in a cool temperature. For your first attempt it will be best to try several varieties, so that you can tell which will give you the best results under the conditions which you have. The Grand Rapids, grown under glass, is deliciously tender, and in my opinion in no way inferior to the head lettuces, although the latter are, of course, more blanched in the centers. Of radishes there are a number of good sorts for using in frames, but after trying a number of varieties I now use nothing but the Crimson Giant Globe and the White Icicle. Both these varieties, besides being of good size and quick to mature, have the further great advantage of remaining an extraordinarily long time without growing pithy, so that not more than half the number of plantings have to be made as with such sorts as the old-fashioned French Breakfast. Of cauliflowers, both Early Snowball and Best Extra Early make a very compact, quick growth, and are early maturing and well suited to growth in frames. Either Victoria or Hardy Winter spinach is suitable for winter growth under glass, and the former, while it will not stand quite so much cold, is of better quality. Personally, however, I prefer Swiss chard, which will give you repeated cuttings, and where the weather is not too severe can be used right through the winter until you need the frame for other purposes in the spring.

Of the vegetables suitable for fall planting, the lettuce, cauliflower and parsley should be started early, the latter part of August or early in September, and transplanted later to the frames. The radishes, spinach or Swiss chard and also onions for bunch onions early in the spring, and carrots, if you prefer to use some of your cold-frame space to have these fresh rather than to depend upon those stored in the cellar, should be planted where they are to grow, but the rows may be made and the beds prepared long before it is necessary to use the glass to protect them from cold weather. If you put them in about the same time that you sow the

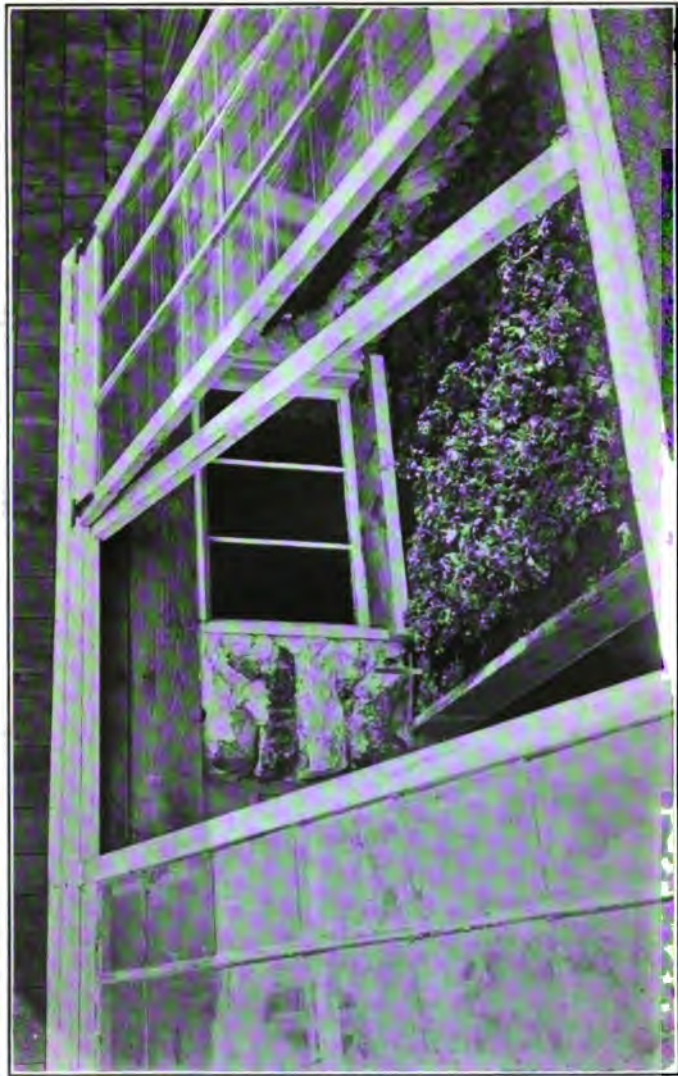


PLATE 23.—Here is a cold frame covered with double glazed sash and heated merely from the furnace room in the cellar, in which lettuce and radishes are grown throughout the winter and plants are started in the spring. Simple, neat, effective.

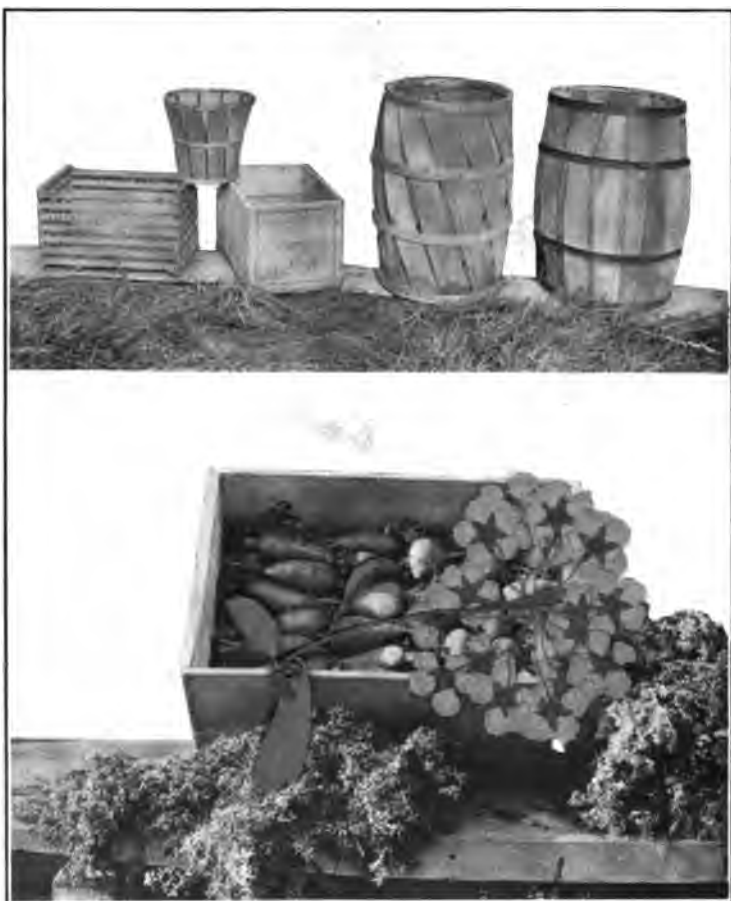


PLATE 24.—Slatted or open work boxes and barrels and the usual tight boxes and barrels for storing vegetables and fruit for winter. All of the containers shown here can be purchased second hand at any grocery store. (*Lower*) Beets and carrots packed in moist sphagnum moss for storing for winter. Moss is much cleaner and lighter than sand, and is especially useful where one has not a regular cellar in which to store winter crops.

others for the first group they will give you results early in the winter.

Soil for Frame Gardening

The soil in the frames should be made rich, mellow and deep by the addition of well-rotted manure to the soil, or by filling in, unless the soil that is in the frame is already in good condition, with several inches of good garden soil. The ground should be soaked thoroughly at least several hours before planting, and it is advisable to have some method of shading the seed bed until after the plants are up, in case of hot, dry weather. An excellent way of doing this is to use one or two of the frames for the seed bed. Then one of the cloth-covered sash may be put over this, supported on a temporary framework a foot or two above the frame, and furnishing the right degree of shade without excluding the air. The lettuce and cauliflower should be transplanted once before being set in their permanent positions, giving the little seedlings three or four inches space each way. The soil for radishes should not be very rich, and especially should it be free from stable manure and supplied with plenty of lime or plaster, otherwise there will be excessive leaf growths with small and poor quality roots.

As already stated, the hot-bed is different from the cold-frame (which depends for its heat upon the retention of the warmth from the sun's rays), in being heated artificially, either by fermenting manure or, in rare instances, by hot water or steam pipes. Now, while your earliest crop of lettuce or cauliflower can go directly into the cold-frames and mature there, the crop which is to follow that, and which will be ready about Christmas time, will in most localities need some artificial heat to carry it through. Therefore, while the plants are growing, make preparations to furnish the heat as follows:

Preparing the "Heat" for a Hot-bed

Secure a supply of manure, getting that from a livery stable, if possible. This should be in good condition and

not "fire-fanged"; that is, not burned to a gray ash appearance by its own heat. This should be composted with litter or leaves, putting in about a third in bulk of the latter material. Pile up the whole in a square heap and give it a thorough wetting, and after about three or four days fork it over, at the same time turning it "inside out," or putting what was outside into the middle when you repack it. For best results this operation should be repeated three or four times, after tramping it down firmly each time. Half a cord of manure will be enough for two or three sashes, as it should be packed in from one to two feet deep, according to the severity of the climate and the vegetables to be grown on it, and be covered with four or, still better, six inches of soil. This manure, of course, after it is used in the hot-beds will be as good as any other for use on your garden or to enrich the cold-frames next spring. The manure should be put in the frames a few days before you want to use it, and its gradual fermentation will then continue to give off heat for a long period.

After setting the plants in their frames in their permanent position they will require no care except an occasional watering to keep the soil in good, moist condition, and the going over the bed with the hand weeder to keep the soil in good, loose condition. As cold weather approaches, however, it will be necessary to put the sash on, and then your real work begins, first because you have got to attend strictly to seeing that they get proper ventilation, and, furthermore, the moisture from rain being cut off, you will have to be more careful about the watering. There is only one rule about ventilation—give all the fresh air you possibly can while maintaining the proper temperature. On bright days strip the sash off altogether, and in rainy weather when it is not too cold. The two greatest troubles with lettuce under glass are the green lice (aphids) and rot. The former may be taken care of by spreading tobacco stems or tobacco dust about the bed under the leaves of the plants, and if this does not keep them away, at the very first sign of one, spray thoroughly with "Aphine," "Black Leaf 40" or some other

nicotine preparation. Rot is caused by too close a temperature or by water lodging in the axles of the leaves; therefore aim to be careful about giving proper ventilation, and in watering see that the soil only is wet, keeping the water off the leaves as much as possible. For this reason also it is a good plan to water only in the early morning, so that the sunlight will have a chance to dry off the surface before night.

October: Second Week

PLANTING BULBS FOR NEXT YEAR'S BLOOM: PROPAGATING ROSES

One of the most important fall planting jobs is to get the spring-flowering bulbs into the ground in good season. The Dutch or French gardener who grew the bulb has made of it what is practically a finished product; the flower is already formed inside, in miniature, and requires only congenial surroundings to bring it to perfection.

Bulbs will bloom the first year in almost any soil, provided they are not kept wet enough to rot. The roots of most varieties will stand an abundance of moisture below the bulb—can, in fact, be flowered in plain water, provided the bulb itself is held above the surface. But even the first season's bloom will be better in soil that is properly prepared, and in poor soil the bulbs will soon peter out, the blossoms becoming fewer and smaller each year.

In congenial soils many sorts may be naturalized and will bloom indefinitely without further attention. Others will continue to give good results as long as they are taken up every second or third year, when the bulbs have become so numerous as to crowd, and replanted. Most bulbs prefer a soil that is sandy in texture—in fact, the sandier the better, provided it is not too poor. Manure may be used to enrich the bulb border or bed, but other materials give as good results and are safer. A mixture of bone meal and ashes, with soot added if it is obtainable, may be used generously as a top-dressing, worked into the bed before the bulbs are planted. If the soil is lacking in humus it may be advisable to employ manure, but only that which is thoroughly rotted; and it should be trenched, or stamped into the bottom of each furrow so it will be well below the bulbs when they are planted. Direct contact of the manure with

the bulbs is likely to cause injury from rotting or disease. If possible it is always well to plant in soil in which bulbs, particularly those of the same kind, have not been grown recently.

Perfect Drainage is Essential

But no matter how rich and otherwise good the soil may be, perfect drainage is essential. There is little danger of being overthorough in this matter, because in the fall, when the root system is being developed, and in the spring, when the flowers are being produced, there is likely to be abundant rainfall. Bulbs can often be used successfully where other flowers would fail on account of midsummer droughts. In heavy soil, which naturally holds a great deal of water in fall or spring, the bed should either be raised a foot or so above the general level, with sod edges, or drained by putting a layer of coal ashes or other coarse material, six inches or so in depth, a foot below the surface.

The beds should be well rounded up and made several weeks before planting. The soil will usually settle two or three inches, but it should be, after settling, high enough so that no surface water can collect on it from winter rain or melting snow when the ground is frozen.

All these bulbs should be planted in the fall in order to get a good root growth before freezing weather. The narcissuses, daffodils and jonquils should be planted three to four inches deep to the tops of the bulbs, and put in as soon as received.

Hyacinths should be put in three to five inches deep, in sandy soil, and it is better to use no manure in the beds. They should be planted about the time the maple leaves are beginning to change color.

The Darwin and other large late tulips should be put four to six inches deep, and the early flowering sorts three to five inches deep. The tulips may be left until the last to be planted—any time within two or three weeks after the leaves fall, or five or six weeks before hard freezing weather.

The crocuses, bulbous irises, and other small bulbs should be planted when received. In very light soil planting should be an inch or so deeper than the figures given above: in grass or sod slightly shallower planting will usually do, as they are more protected than in the open ground.

While most of the bulbs do well in any kind of soil, for the best success it should be made rich; you should not, however, use fresh manure for this purpose, as portions of it are quite sure to come in contact with the bulbs and injure them. Bone meal, prepared sheep manure or very thoroughly rotted and fine stable manure may be used, or nothing at all added if the ground is in fairly good shape from manuring of previous plantings.

While the bulbs may be set any time until the ground freezes, the best results are to be had if they are planted immediately after the first hard, killing frost, as this gives them a longer period in which to take root growth in the fall before the ground is frozen so hard that all growth stops. If put in too early, however, they will make some top growth, which should be avoided. If you have not yet ordered your bulbs for this year you should send in your order immediately. Get the bulb bed or border ready now, and plant as soon as you receive the bulbs from the seedsman.

How Deep to Plant Bulbs

As to the depth at which they should be planted, place them down far enough, being sure to get them right side up, so that the top of the bulb is about one and one-half times as far below the surface as the bulb is thick through. This will give a depth of from three to four inches for the average size hyacinth and two to five inches for tulips, and two to four inches for the various sized narcissi. Where bulbs are naturalized in a sod they need not be put in quite so deep, as the sod and grass form part of the covering and also form some protection from freezing.

In planting in the beds first lay out all the bulbs with their proper tags, to be sure of getting them evenly distributed

and correctly placed. If they are to be put in quite thickly, as in using hyacinths in designs in solid beds, it will sometimes save time and insure perfect results to excavate the whole bed to the depth of several inches, put the bulbs in place, and cover. When several sorts are to be used in the same bed, planted at different depths, the same method may be used, starting with those to be planted deepest and covering a layer at a time.

Usually the quickest method of planting is with a blunt dibble, marked plainly from two to ten inches, so that you can tell just how deep you are making the holes. A pail of coarse sand should also be at hand, and a handful or so placed in the bottom of each hole; this protects the bulb, insures good drainage directly under it, and prevents it from resting over an empty air-space left by the point of the dibble.

The Bulbous Irises

The Spanish irises seem to be less known than either the Germans or the Japs, but they deserve wide popularity. They may be grown easily almost anywhere. Moreover, they are the cheapest of all irises, the bulbs usually costing only a few cents a hundred. They are more delicate in form and coloring than any of the popular sorts.

All the common forms of iris should be transplanted in summer. Handling at the usual spring-gardening season is a direct injury and involves the loss of at least one year. At any time after the blossoms fall the plants may be lifted and divided and the separated root stocks put out wherever they are wanted. This highly important fact with respect to the time to transplant irises seems to be widely overlooked.

Exception must be made, however, in the case of the Spanish irises. These grow from bulbs like tulips or crocuses. The bulbs are grown extensively in Holland and are brought to this country every fall along with the other bulbs, arriving in September. They should be planted out at once. They will make a splendid display the following

spring, and in favoring soils will continue to grow and bloom for several years. Those who have never tried the Spanish irises should do so this fall.

In planting lay out carefully all the bulbs first on the surface of the soil and then plant them. Or, if several different sorts are to be put in one bed, you can remove part of the surface of the soil and plant them in layers, putting in first those that grow, say, four inches deep, covering them with an inch of soil, then putting in the three-inch depth ones, covering another inch, and then the two-inch deep ones.

As well as the bulbs which have been mentioned in detail in the preceding paragraphs there are a number of others valuable for fall planting for spring flowers, particularly where the longest possible succession of flowers is wanted—snowdrops, scillas and chionodoxas—all of which are suitable for naturalizing in the grass and are the first to come into bloom. These are followed by the crocuses, and these, in turn, by the hyacinths, tulips and narcissi, with the hardy lilies completing the programme and carrying the succession of flowers in the garden from early April through July into August.

All fall-planted bulbs, except those naturalized in sod, should be protected with a winter mulch. Leaves or straw should be used; manure, which is excellent for most purposes, should be avoided. The mulch should not be applied until after a week or so of continuous cold weather has frozen the surface of the ground.

Prepare Hardwood Rose Cuttings to Root Next Winter

It is not a difficult matter to increase your supply of garden roses from rooted cuttings. To grow plants by this method take cuttings of the current season's wood at the end of the growing season, allowing three eyes or buds to each cutting. Tie each variety in a bundle and bury outdoors until midwinter. Then strike them in moist sand in flats three inches deep. Be sure to get the lower bud

on the cutting—the one nearest the main stem—in the sand about an inch and have the sand fit tightly about it, or air will get in and prevent proper callusing and rooting. The two buds above the sand should send out shoots.

In about twenty-five days they should be rooted enough to pot into two-inch pots, in loose, loamy soil, and put into heat and moist air. After the cuttings are struck water them only early in the morning, so the top of the sand will dry before night, or they may be attacked with a fungous disease known as cutting-bed fungus, for which there is no cure. When the two-inch pots are filled with roots change the plants to four-inch ones or set them at once in the borders where they are to remain.

October: Third Week

SAVING THE SEASON'S PRODUCE: HARVESTING AND STORING VEGETABLES AND FRUITS

In harvesting, as in planting, the various crops may be considered in two general groups—the hardy and the tender. The small grower may not be able to have storage facilities especially designed to accommodate special crops, but he can provide suitable quarters by the use of a little ingenuity. A good dry, cool, tight cellar is of the greatest value for storage purposes, but even where such is not available, substitutes may be found. Among the tender crops which will need attention first, are the following:

SQUASHES, PUMPKINS, MELONS and CUCUMBERS should be gathered before danger of first killing frost. Usually a light "touch" that blackens the foliage will come first as a reminder, but if it is getting late in the season, do not wait for this warning. The muskmelons and cucumbers may be cut where the stem joins the vine, but the squashes, pumpkins and watermelons should be cut with an inch or so of vine on each side of the stem, which should never be broken off.

Brush the soil from under the side, and turn them bottom side up to dry thoroughly. Handle them always as if they were eggs. Even though the rind may seem quite hard it bruises very easily, and a bruise that cannot be seen at all when it is made will develop later into a decayed spot that will spread rapidly over the whole fruit and possibly spoil those next to it. The drier the air the better (an ideal place being in a room with a furnace or stove), but the temperature should be kept as near forty degrees as possible. Don't discard the small immature squashes gathered: these are the best to keep, and often may be had in good condition for the table after the larger ones have been used. Melons

and cucumbers may be stored in straw or leaves in a dark cool place, and used up as they ripen.

BEANS. All the pole beans and most of the bush beans are good for winter use, gathered as soon as the pods dry, even if there is no danger of frost. If the work has to be done in a hurry, the plants may be pulled and hung up under cover where they will dry.

TOMATOES. The first hard frost usually doubles the price of tomatoes. All the fruits on the vines should be gathered when the first hard frost threatens. The more mature will ripen up gradually for some time to come, and the green ones are usually in good demand for pickling. A few plants may be taken up and hung upside down in a shed or dry cellar, letting the fruit ripen on the vines, which it will continue to do for a surprisingly long time. Some of the best of the green fruits placed in clean straw in a dry cold part of the cellar or storehouse or in a frame will often ripen for Thanksgiving and even later.

OKRA. The plants may be cut and the pods allowed to dry, and saved for use in soups or for flavoring.

SWEET POTATOES should be dug as soon as the tops are killed, dried thoroughly, and then stored in open crates in the attic near a chimney, or in some similar spot where they can be kept as dry and as warm as possible.

EGGPLANTS and **PEPPERS**, though usually not injured by the first light frosts that blacken the leaves, should be gathered before danger of frosts that would blister the fruits, and kept in the same way as suggested for melons and cucumbers.

SWEET CORN. When frost threatens, cut stalks and all, just as for field corn. It may be "shocked" in the same way, and the ears will remain in good condition much longer than if pulled from the stalks.

FRUITS. In picking the tree fruits too much care cannot be taken to prevent the slightest bruising. A bruise so slight as to be invisible at the time will develop into a decayed spot later. Only the soundest and greenest should be stored away. Barrels, or cracker boxes, which hold prac-

tically a bushel each, make good containers. The latter for home use are more convenient. Pears should be stored in a dark, cool, well-ventilated place. The rapidity with which they ripen will depend to a large extent upon the temperature. For long keeping it should be kept as near thirty-two as possible.

Late Crops for Winter Storing

While a number of the late crops are handled in much the same way, three of the most important of them,—potatoes, onions, and celery,—require individual methods of treatment.

POTATOES for storing should not be dug until they are thoroughly matured as indicated by both the firmness of the skin and the cooking qualities. Dead vines are not a sure guide, as they may dry up prematurely from drought, blight or frost. In cases where it is due to blight the tubers in the soil will begin to rot, and should be left until all that are going to spoil have done so. Otherwise they will rot after digging. The tubers should be left in the sun long enough to get thoroughly dried off, but not to sun-burn, as this spoils the table quality.

ONIONS. Success in keeping onions will depend very largely upon the care given in harvesting. After the tops dry down they should be pulled and laid in rows, and turned every day until they are thoroughly dried. Then they should be brought under cover—cutting off the tops or not, as conditions permit—where the air may circulate freely about them in all directions. Spread them out thin on the floor or pack them in slatted bushel crates. The white varieties must be cured under cover or they will turn green, and if they get a ghost of a chance begin to sprout again immediately. No onions, after the tops die, should be left in the ground. Before hard freezing weather they should be sorted over again and the soundest and driest stored for long keeping, the others being put aside for more immediate use.

CELERY. Such celery as is wanted for early use is blanched in the field by drawing the earth up to the stalks in two or three successive hoeings; by the use of boards; or by the use of one of the convenient "celery bleachers" now on the market. The latter are especially useful for the home garden, where only a few stalks are wanted at a time. The stalks should be blanched clear up to the foliage. That part of the crop wanted for winter and spring use should have the soil worked in about the stalks sufficiently to hold them in an upright position. Upon the approach of hard frosts, about November first, part of it may be "trenched," or blanched in a long narrow ditch, dug in some well-drained convenient position. It should be about a foot wide and deep enough to take the celery plants, standing on end as they grew, with the tips of the foliage about level with the soil surface. It should be taken up, roots and all, and packed in close in the trench. As hard freezing weather approaches the tops should be covered with meadow hay and boards to prevent freezing. This will keep in good condition until the advent of real winter weather.

The part of the crop wanted for winter and early spring use should be taken up, before hard frosts, and stored in long narrow boxes about a foot wide and deep enough to take the plants upright, packed in snugly together. As in trenching, the roots should be left on, and a couple of inches of moist sand should be put in the bottom of each box. These boxes may then be packed in a cold dark cellar, and the stalks will blanch out by the time they are needed. Boxes of the required shape and size may readily be made from plain pine boards, with a row of small holes bored in the ends of each to serve as handles. Celery should be handled or stored only when it is perfectly dry.

BEETS, CARROTS, and TURNIPS and RADISHES will not be injured by the first light frosts. **PARSNIPS and SALSIFY** (or oyster plant) may be left in the ground all winter, without injury, but of course the bulk of these crops should be taken up, as once the ground freezes, it is next to impossible

to get the roots out until spring. All these root crops should be gathered and "topped," being careful not to cut too close, causing the roots to bleed, and stored temporarily in piles so that they may be covered at night if there is danger of freezing. To keep well for a long period they should not only be stored in a dark cold place, where the temperature may be kept well down toward the freezing point, but should be packed in sand or moss. The only objection to the former material is its great weight. Sphagnum or swamp moss may be gathered free in most places, or a few bushels bought from a local florist. It is clean, and light, and stays moist without being wet, for a long time, making an ideal packing for the root crops.

CABBAGE. A small quantity may be kept in a storeroom if it is cool and dark. A good way is to tie several heads together, first removing the outside leaves, by the roots, and suspend from a nail. Where any amount is to be saved, however, it is usually "pitted." A common method is to simply dig a trench wide enough to take two heads side by side, and deep enough so that when another head is placed on top, the roots will come about level with the surface of the soil. Cabbages should not be trenched or pitted until cold weather, and as hard freezing weather sets in should be gradually covered up with meadow hay, corn stalks or other mulching sufficiently deep to prevent their freezing hard. Those to be kept over winter, through very hard freezing, should have a layer of earth over the mulch, and a second layer of mulch over this. The trench may be lined with hay, straw, or boards to make more certain of keeping the contents dry and clean. **BRUSSELS SPROUTS** and **KALE** may be left where they grow, as they are perfectly hardy.

LETTUCE will stand more or less cold weather, and may be had for several weeks later than usual by simply covering it with bog hay to protect it from the first frosts, after which we frequently have two or three weeks of good growing weather. Small plants, which were started in August or September, may be transplanted to the cold-frames in October, where by the use of double sash, they may be

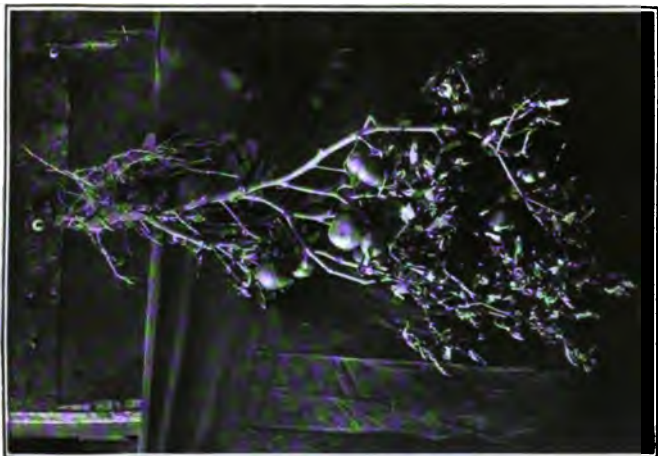


PLATE 25.—Tomatoes can be ripened after frost by hanging the vines, with the largest fruits, in a sheltered place. Cabbage may be hung from the cellar rafters, several heads together.



PLATE 26.—Rose bush protected by pine boughs tied in position with tarred string. (*Lower*) Chicken wire border to hold mulch in place for a hardy border or a rose bed.

had through most of the winter, even in quite severe climates.

PARSLEY should be cut back severely, a few roots taken up and put in pots or a small box, with drainage holes in the bottom, and after being allowed to root for a week or so in a cool shaded place, may be kept throughout the winter in any light place where the temperature does not go below forty at night.

Substitutes for Cellars

If a furnace is used, a double partition should separate it from the part of the cellar used for storing the vegetables. Where the cellar is only one large room such a partition may be cheaply and quickly put up with "wallboard," which comes in large sheets and is very easy to use. Where no cellar is available a room on the north side of the house, which may be kept dark and cool but safe from freezing on cold nights, may be utilized to advantage. Root crops may be stored in a pit, like cabbage.

All fruits and vegetables should be clean, dry and sound when stored, and the storage room and boxes and barrels kept perfectly clean. Cellars should be whitewashed every fall. Ventilation is also very important. Until freezing weather ventilation should be given on cold nights, and shut off during warm days, the aim being to keep the temperature as constant as possible—about 35 degrees F. being right for most vegetables. Where any amount of things are to be stored it will pay well to get a few each of the following: sugar or flour barrels; clean cracker boxes; slatted crates; slat vegetable barrels; and peach baskets, which are handy for small amounts.

October: Fourth Week

FRESH VEGETABLES ALL WINTER: PLAN TO KEEP THE SMALL GREENHOUSE BUSY WITH SUCCESSION CROPS UNTIL SPRING

At least some of the fresh vegetables which winter gardening makes possible should be enjoyed by every possessor of a greenhouse, no matter how small it is. Anyone whose gardening experience has been confined wholly to crops out-of-doors will be surprised at the very small amount of space required to furnish the average home table with such fresh vegetables as are usually forced during the winter months. Take lettuce, for instance: in the garden, under what you consider intensive cultivation, you plant it 12 inches apart each way—144 square inches to a plant. Under glass, it can be grown as close together as 6 inches each way for the loose leaf kind, and 7 x 7 inches for the heading sort—36 and 49 square inches, respectively! At the former distance, on a bench space only 3 x 6 feet, seventy-two heads can be grown. True, for commercial purposes, these distances are usually increased an inch each way; but, where the crop is to be used for the home table, and where every other head can be taken out, before they are quite matured, the distances named are ample.

I have grown tomatoes successfully as close together as 18 inches each way; and in a small greenhouse, where many flowers are grown, and where space is not available for tomatoes, I have seen them grown successfully in wooden boxes about 15 inches square and 8 deep, which were placed upon the floor in positions where the vines could be trained up. In both cases they were, of course, trained to a single stalk and a great deal of the foliage removed. Cucumbers may be handled in much the same way. Where forced commercially, they are usually given at least 8 feet of head

room, but it is possible to grow them on a side bench within two feet or so of the glass, the vines being trained on heavy string or wires run some 6 inches below the glass and supported from the sash bars. Half a dozen vines, with good results, will yield a generous supply of cucumbers at a time when a single one is prized.

Radishes mature so quickly where they are given ideal conditions that they may be used as a "catch" crop between other vegetables, or a short piece of row 2 or 3 feet long sown every week—the rows need be only 4 to 6 inches apart—will keep the table supplied with delicious, crisp roots.

Varieties for Under Glass Gardening

In achieving success with vegetable forcing in winter, nothing is more important than the selection of suitable varieties. The loose leaf type will do better than the head lettuces, and for winter use, nothing is superior to Grand Rapids. It not only takes less room than a heading sort, but matures in a shorter time, can be eaten at any and every stage of development and is the healthiest and easiest to grow of any lettuce I have ever tried under glass. If, however, you *must* have a head lettuce, there is none superior in quality to the little Mignonette, and it can be planted as close together as 6 or 7 inches. Other sorts that can be used, however, are Hittinger's Belmont, Hothouse, Boston Market, and Big Boston, the last thriving well in a cooler temperature than that required for the other sorts, except Grand Rapids.

Of radishes which can be grown in the same temperature as lettuce, Rapid Red is one of the earliest and best of the small or button type. Personally, however, I prefer Crimson Giant, a sort which, while it does not mature as early as many others, is large enough to eat as soon as any of them and retains its good quality until it attains large size. Comet is a good tomato for inside use; the fruits, while not as large as those grown outside, are specially pleasing in appearance and are superior in quality. Bonnie Best and

Chalk's Early Jewel I have also grown successfully inside. The English forcing varieties of tomato are especially fine. Of cucumbers, Davis's Perfect and Vickery's Forcing are both excellent kinds. Telegraph and Sion House are proved varieties of the English cucumbers, which grow to a much greater length than the American sorts and are generally considered to be of much superior quality. Of beets, Early Model, Eclipse, and Crosby's Egyptian are good for forcing, but the latter, although it is still a favorite variety, I do not consider equal in quality to the others. Among carrots, Early Scarlet Horn, French Forcing and Nantes are good. If growing only one variety, I should plant the latter as some of the roots will be ready to use almost as early as some of the other sorts, and those remaining as the rows are thinned out for use will continue to grow. If you want to try beans, grow a first quality early sort, such as Early Bountiful.

After settling the question of varieties, there are, of course, the details of temperature, ventilation, fertilization and so forth, which have to be looked after with each of the several crops that have been mentioned.

Lettuce All Winter

As I have already said the loose-leaved lettuce is more certain to give satisfactory results under glass than the heading sorts. There is, however, no reason why you should not succeed with the latter if you like it enough better to pay for the extra care required. Greater care in watering will be necessary, especially after the heads begin to form. It is best to apply the water to the soil only, and to water on bright days, so that the surface of the soil and any parts of the foliage which have become wet may be dried off before night. During the larger part of the development of the plant a temperature of 45 to 50 degrees at night should be maintained, but just after setting the plants in the bed and while the heads are forming about 5 degrees less than that will be safer. Both Grand Rapids and Big Boston will do well with a temperature of 40 to 50 degrees

throughout their growth. For quick results with lettuce *now* you should buy plants from some neighboring florist or market gardener, or they may be had by mail at very slight expense. The plants are transplanted once before being set where they are to mature, thus securing a saving of space during more than half their period of growth. A small flat of seeds or a couple of feet of drill along the edge of a bench planted now will give you enough plants to follow up the crop which you set out at this time.

Cucumbers and Tomatoes Follow Lettuce

December and January are the months in which cucumbers and tomatoes are generally sown, so they can be used to follow the lettuce when the strengthening sunshine and the warmer nights makes it more feasible to maintain the 60 or 70 degrees at night and the 80 to 90 degrees during the day required for the best development of the plants. If the greenhouse is so small that there is no separate warm section in which these things can be started and brought on until space is available in which they may be set out, a small frame on the order of a cold-frame may be used *in* the house so that the temperature in it may be carried a few degrees higher than in the rest of the house.

The tomatoes are started in the usual way, but at the transplanting after the first (or at the first if the seed is sown very thinly so that extra strong, large seedlings may be attained) the young plants may be put into three or four-inch pots, and after they have filled these, which will be in the course of two or three weeks if the conditions are right, they may be shifted into a size larger if bench room is not yet available for setting them out. An abundance of well-rotted manure and a little fine bone meal should be mixed with the potting soil. If paper pots instead of clay are used, it will be a much easier task to keep them from drying out. As cucumbers are difficult to transplant unless one has had experience with them, it is best to start a few seeds, not more than four or five, in each of the required

number of paper pots, and after these are well up, thin them out to not more than two. They should be given plenty of light and kept as near the glass as possible so that they will not become drawn and weak. A rich compost with a layer of fine manure at the bottom, if used in the pots, will give the plants a strong start in the few weeks' time they have to get ready for their permanent position.

When the plants are ready to be set, and a solid bed and manure that is still actively fermenting—such as you would use for a hot-bed—are available, a narrow trench with the manure packed in tight at the bottom under the plants will give them an extra start after transplanting. Where this method is not practicable, make a generous hole for each plant, enriching it well with either fine, short manure or a good handful of a mixture of cotton-seed meal, bone-dust and dried-blood or tankage. Keep the plants carefully shaded for a few days after setting them out. Under these congenial conditions, both tomatoes and cucumbers will make a very rapid growth. Training should be attended to carefully and constantly. All side shoots should be removed from the tomatoes as soon as they are big enough to pinch out and a large part of the foliage, where it interlaces or shades the young fruit, may be cut out with advantage.

For radishes, beets, and carrots the soil should not be made too rich, especially in nitrogen, as this has a tendency to produce rank growth of top and an inferior quality of roots. I have found that a liberal dressing of unleached wood ashes gives especially good results with these, and a single pailful of ashes goes quite a way in the greenhouse. All of these things will do well with a temperature the same as that given lettuce. The radishes may be sown in rows very thinly from 4 to 6 inches apart and the beets and carrots from 10 to 12 inches. The beets are generally transplanted the same way as lettuce except that they are set only 3 or 4 inches apart, but they may be grown directly from seed if there is space enough for them. You can grow a row of radishes between the rows of beets and carrots.

Ventilation and Watering

In growing vegetables under glass, there are a number of things to be attended to that one ordinarily pays no attention to out-of-doors. One of the most important of these is fresh air. This is essential not only for keeping the plants in vigorous growth but it is practically a preventive for troubles with insects and disease. While direct draughts, especially in cold weather, should be avoided, ventilation should be given every day and for as long a time as possible without getting the temperature of the house too low.

While plenty of moisture is essential, the beginner is more likely to do damage by giving too much of it. The soil should be thoroughly wet just before—or just after—setting out the plants. After that water should be given only as the condition of the soil seems to indicate that water is needed. Water as seldom as possible, but water thoroughly, and if possible only on bright days so that the foliage and the surface of the soil will be dried off by evening. While watering once in several days will be sufficient for a crop grown at a low temperature in midwinter, cucumbers and tomatoes which usually are making their greatest development in early spring when the sun is strong enough to run the house up to 80 or 90 degrees on bright days, often require a good watering every day. Frequent cultivation, whether any weeds appear or not, is just as essential indoors as out.

Don't Let the Bugs Get a Start

What is perhaps the most important point of all I mention last for the sake of emphasis—that is—never let a bug appear, or if he does appear, never let him live 24 hours. But prevention is very much easier and quicker than any remedy. Use good strong tobacco dust freely on the soil and about the plant and if necessary on the foliage. If this is attended to, further trouble will seldom be experienced. The green plant lice or aphids and the white fly are the things most likely to cause trouble. If these do appear,

spray the former with a nicotine extract (which may be had in a number of readily available forms such as "Aphine" and "Black Leaf 40" to be used after simply diluting with water); and for the latter use fumigation or nicotine extract for the matured flies and kerosene emulsion for the young or nymphs, which resemble, and must be treated exactly as if they were scales. Examine your plants carefully at least once every week, as these, like other insect pests, are inconspicuous when they first put in their appearance and keep out of sight until they have mobilized large armies of descendants.

October: Fifth Week

CONCRETE: WHAT YOU CAN DO WITH IT; AND HOW TO USE IT. IRON PIPE FOR MANY PURPOSES

Exceptional indeed is the place the owner of which cannot think of some improvement, or some dozen improvements, that he would like to see made. Walks, culverts, troughs, hitching-posts, fence-posts, fountains, retaining walls, hot-beds, vegetable pits, steps, foundations and supports for buildings, floors, pergolas, summer-houses, hand-rails, to say nothing of more elaborate things, such as ice-houses, root-cellar, tanks, and so forth, are all within his reach when he has at his disposal concrete and iron pipe. Such jobs may be undertaken at any time of the year until freezing weather.

The use of concrete is simplicity itself. The only ingredients required are Portland cement, clean, medium-coarse sand, gravel, and water. In place of gravel, clean cinders or crushed stone may be used. Sometimes it is possible to get gravel that is mixed with sand in the proper proportion as it comes from the bank. Ordinarily, however, it should be screened, so that the sand and gravel may be measured separately. Having the ingredients accurately proportioned is one of the most important factors in achieving successful results with concrete, and requires some attention.

The mixture of the ingredients is based on the principle of having the particles of sand of sufficient number to fill the spaces in the gravel or crushed stone, and the particles of cement—which is ground to a microscopic fineness—fill the minute spaces between the grains of sand. After such a mixture has “set” or hardened, the result is a monolithic compound so strong that if it is broken with a hammer the

fracture will be found to run through the stones. It is practically solid rock.

The proportions of the ingredients are varied according to the nature of the work for which the concrete is to be used. There are three standard formulas, known respectively as "lean," "medium" and "rich" mixtures. The former is used for thick retaining walls, floors, sub-bases and anywhere where bulk and weight, rather than strength, are required. A medium mixture is used for ordinary purposes, such as walks, curbs, steps, walls, etc., and a rich mixture where great strength, fine finish or imperviousness to moisture are needed, such as for more elaborate forms of walls, garden furniture, supporting posts, thin walls, etc. "Reinforced" concrete is simply concrete with some material, usually metal in the shape of wires, rods or woven-wire netting, to give it extra strength for such uses as complicated forms, thin walls, floors, and anywhere where special stress and strain may be encountered.

The proportions for these several mixtures are usually as follows, though, of course, they may be varied after one has a little experience, as the requirements of the job suggest:

Lean mixture: One part cement; three parts sand; six parts gravel.

Medium mixture: One cement; two and one-half sand; five gravel.

Rich mixture: One cement; two sand; four gravel.

Finishing mixture: Three shovelful of clean, sharp sand to ten pounds of cement.

The latter mixture is used for finishing off curbs and gutters, surfacing walks or walls, etc. It should always be applied before the first form has set hard.

After the materials are got together, and you know exactly what you want to construct, the forms must be prepared. For most work they are made of wood. The "form" is simply a casing to hold the wet cement in shape until it hardens. For any job that requires considerable concrete, the forms are generally made in sectional units, which can be used over and over. In making up the forms,

two things are necessary: They must be rigid; any "give," bulge or leak will leave a corresponding defacement on the finished job that cannot be rectified afterward. And the "face" of the form, which comes next to the wet concrete, must be smooth; any crack or roughness will leave a corresponding mark on the concrete, or the form may stick to the concrete so that it will have to be broken away, thereby spoiling the job. The forms are kept from spreading by bracing on the outside and by using bolts and washers at intervals to hold them together. In the latter case these should be well greased before the concrete is poured into the forms, and removed as soon as the concrete takes its initial set—when it has become firm, but not hard—so that it holds its own shape. For very smooth surfaces the forms should be carefully fitted and planed and oiled before each using. Bolts, braces, rings, studding for partitions, or anything of that nature, may be put in place and the concrete made around them, or holes or slots of any desired size and shape may be made by putting in a piece of wood made smooth and well greased so that it may be withdrawn after the concrete is partly set. Holes can be filled with the "finishing mixture."

Mixing and Tamping Concrete

Having the forms ready and the materials on hand, the job of mixing, once it is begun, should be done as expeditiously as possible. A substantial, smooth, tight platform or a shallow box of suitable size should be provided. On or in this place the gravel, sand and cement, in the order named, measuring each carefully. With a shovel or hoe mix them, dry, quite thoroughly; then add the water a little at a time, while continuing the mixing, until you get a uniform, slushy mass just wet enough to pour. The water may be added in quite large doses at first, but as the "batch" approaches the proper degree of slushiness it should be added sparingly. A mixture that is too wet will not make uniform material.

As soon as the batch is mixed it should be placed at once in the forms, using for the purpose a shovel or cheap metal pails, if it has to be carried. It should be tamped down into the form firmly enough to prevent air spaces being left. If a wall is being made, a thin paddle of wood or iron passed along either side next to the form will leave a smoother surface, as the larger particles of gravel or stone are pushed back. After the form is filled it should be left absolutely undisturbed until it has set hard—usually at least twenty-four hours, though forty-eight is preferable. The forms, if carefully handled, may then be removed, to use again, although the concrete will still be “green” and easily marred or broken. If made where it will be subject to weight or stress when the forms are removed the concrete should be left to harden thoroughly with the forms in place. If there is danger of frosty weather cover the concrete with old bags, blankets, or, for outside work, with warm manure, to protect it from freezing. Be careful to mix only what can be used at once for each batch; any surplus must be thrown away, as it is useless after it begins to harden. Wash up clean *at once* all shovels, hoes, trowels, markers, pails, forms or mixing-bed, etc., which have been in contact with the wet concrete; otherwise you will find them ruined when you go to use them again.

Concrete Pots and Vases

By taking advantage of ready-made forms a great number of difficult-looking things may be moulded with practically no trouble. Large concrete pots or vases, for instance, are easily made by getting lard-tubs or candy pails of such size that one will fit inside the other, leaving a space of an inch or two as a form, and imbedding a cork or wooden plug in the concrete bottom (which is put in the large pail before the smaller one is set inside), to be removed for a drainage hole. An ordinary cracker-box, with the bottom removed, makes a good form for a small stepping stone. Cylindrical posts or supports of any size, or rounded cor-

ners for walls, may readily be constructed by using pieces of sheet iron or tin, held in place by wire or nails or by short stakes, until the concrete sets. A machine may be purchased at a reasonable figure which makes hollow concrete blocks. They may be made a few at a time and kept indefinitely. With them almost any sort of building operation may be undertaken.

Iron Pipe for Many Purposes

With anything but the very simplest kinds of work it is best to make a detailed line drawing, with exact dimensions of just what you plan to construct. Otherwise you will find yourself making numerous inaccuracies and mistakes. Very often, too, it is possible to make an excavation serve as one side of the form. In making a cold-frame or a root-pit against a bank, for instance, the back and at least part of the two ends may be formed by digging the bank down square and erecting the inner form several inches in front of this. For cold-frames it is possible to buy a cast iron "cap" that fits over the concrete wall and designed especially to make a good, snug fit for the sash. There are permanent wash colors also made especially for use with concrete, with which one may get any desired "tone" to harmonize with buildings or surroundings.

Along with concrete, one should learn the possibilities of iron pipe. Common water or gas pipe is used, and for most purposes secondhand pipe will answer as well as new. Embedded in concrete, it is practically everlasting. It is ideal to use for inexpensive arches, trellises, supporting columns, etc. Formerly it was necessary to have a set of pipe-tools to fit and thread the pieces into their various positions. Now, however, one may get "split fittings" to hold the pieces of pipe together wherever nothing is to be used inside of them. They are put on with an ordinary monkey wrench; a short bolt which passes between the ends of the pipe, or double bolts, straddling it, being used to hold the fittings in place, so that the only tool necessary is a pipe-cutter or a hack-saw to cut the pipe into required lengths.

November: First Week

MAKING HOUSE PLANTS AT HOME FOR THE WINTER: THE CONDITIONS THAT FAVOR HEALTHY GROWTH; THE PROBLEM OF HEATING. MATERIALS FOR NEXT SPRING

There are several sources from which plants for winter bloom and decorative purposes may be obtained. Some may have been saved from the summer garden, others may be regular "house plants," kept in pots the year round; still others may have been bought at the florist's in the fall, either especially for the winter window garden, or, being new and expensive varieties, to serve as "stock" plants to be used for purpose of propagation. But whatever their sources, or the reason for keeping them over winter, they will alike demand congenial conditions if they are to prove a pleasure and a success instead of a nuisance and a failure. And while there are dozens of plants which may be grown with at least a fair degree of success in the ordinary dwelling house, they all demand, with comparatively minor differences in the matters of light and temperature, the same general conditions.

In establishing a congenial environment for plants indoors there are of course four chief factors to be considered—light, temperature, moisture, and soil.

Give Abundant Light

An unstinted supply of light is required by most of the plants suited for house culture; during the winter months very few of them can be given too much even of direct sunlight. Many plants will for a time tolerate a rather dim light, especially if they are in a semi-dormant condition,

as some plants are at this period; but for plants which it is desired to keep growing, as a general rule, the more light the better. Without sufficient light, they will fail to make strong, normal tissue, although growth will continue; the stems are drawn out and weak, and the foliage is pale and soft; one of the most serious results is that the whole plant will readily fall prey to the first attack of insects or disease, which in turn are usually encouraged by just the conditions which are unfavorable for the plant. In selecting quarters for your winter garden, then, procure all the light possible. And for flowering plants, such as geraniums, heliotropes, and begonias, direct sunshine, for at least part of the day, is quite essential.

What is the Right Temperature?

There are few dwelling houses in these days where the temperature cannot be kept sufficiently high in at least the one or two rooms selected for the window garden to answer the requirements of all the commoner house plants. Great extremes of temperature during the day and night are more likely to be a cause of trouble than too low a temperature. During the day, and evening when the rooms are occupied, and while the sun is shining, the temperature may run up to 70 or 80 degrees, and then drop during the night to 40 or below; such a range of temperature is trying on the constitution of any plant, especially when it is accompanied, as is most apt to be the case, by a desiccated atmosphere. A temperature of 60 to 70 degrees during the day, and 50 to 55 during the night, will be sufficient for most house plants, though a few degrees more will not be harmful, and a few degrees less will not prove fatal, but simply retard or check growth. But a temperature as *even* as may be given is highly desirable. The fewer variations above or below these figures the better. In extreme weather it may not be possible to keep the temperature from going down to forty, or even below; this need not prove serious unless it is repeated so frequently that the plants are checked, or seem

to stand still. A sudden chill may cause a heliotrope, fuchsia, or lemon verbena to drop its leaves, without in the least permanently injuring it. Plants that are quite dry will stand colder temperature than if moist; and the same is true if they are partly dormant rather than in active growth.

The plant room need not necessarily be proof against the very coldest winter weather, In case of emergency several thicknesses of newspaper placed just inside the glass, so as to form a dead air space, will keep out extra severe cold; and if this is not enough the plants can be huddled about the stove or radiator for a night or two.

Moisture the Most Difficult Problem

The matter of moisture, which at first glance probably seems the factor easiest to control, is the most difficult. When "moisture" is spoken of in this connection, most persons assume that it is merely the watering of the plants which is meant. That in itself is not as simple a problem as may at first appear; but it is not nearly so difficult as the greater one of the moisture *in the air*, which directly affects the health and condition of the plants. A dried-out atmosphere is the most difficult disadvantage to overcome in growing plants in the house. Houses heated by steam and hot air are the most likely to be objectionable in this respect. If plants are to be grown successfully under such conditions, provision to counteract this dry atmosphere must be made. Extra care in the matter of watering will help to some extent, but that alone is not sufficient. Water kept where it may evaporate freely, and thus to some extent re-saturate the dried-out air is very effective; keep bowls or pans of water on the radiators or registers—the number of times you find it necessary to replenish them will give you some idea of the amount of moisture that is burned out of the atmosphere by such a heating system. Another corrective is frequent ventilation; the new air is valuable not only for the fresh supply of oxygen, but has a normal

moisture content. As a general rule, give all the fresh air you can, while keeping the temperature sufficiently high. The arrangements for ventilation should be such, however, that no direct draft strikes the plants.

In regard to the soil, plants which have been freshly potted in the fall or summer, should in most cases have sufficient nutriment to carry them through the winter. But growing plants, which may require repotting before spring, and those which are wanted for continuous blooming, will require additional plant food either in the form of soil, or in concentrated fertilizer of one sort or another. Moreover, proper watering of the plants in pots,—as the great majority of house plants are kept—requires that when they are watered the soil be thoroughly saturated, and then allowed to drain off freely. All these things mean more or less musing about, and can be done better where provision for just this work has been made.

Make a Place Especially for Your Plants

Here, then, are the conditions which the indoor gardener has to establish if he would make reasonably certain of success. Needless to say, there are few houses where all of them may be had at their best without some special provision being made to overcome the lack of some one desirable thing or another. In the great majority of cases it will pay and pay well to give a little thought and time to providing a place for your plants where they may be cared for with the greatest ease and under the most favorable conditions. In selecting or constructing such a place, remember your objects are (1), to supply an abundance of light; (2) to control the temperature; (3) to maintain a normally moist atmosphere; and (4), to provide a place where you can do the *work* which may be required in properly tending the plants, watering, etc.

Where a bay-window, or a part of a tightly enclosed porch that may be heated, is available, all of these conditions may be supplied with little trouble. One of the first

things to do is to arrange things so that the space to be used for flowers,—great or small as the case may be—may be *cut off* from the rest of the living-room or porch. This partition does not have to be either air-tight or permanent, but the tighter the better. One simple plan is to arrange fairly heavy curtains, reaching from ceiling to floor, which may be drawn at will to shut the plants in by themselves. Light doors, made largely of glass, have the advantage over curtains that the plants can still be seen and enjoyed while the doors are shut.

Two Simply Made Window Gardens

Where no such ready-made advantage as the above is at hand, and nothing as ambitious as a small conservatory can be attempted, the garden may be placed wholly or partly outside of the window or windows by constructing a miniature glass “lean-to” on the outside, supported by suitably strong brackets attached to the house. I have seen several very ingenious forms of the little winter gardens, which afford all the conditions required quite perfectly where there are but a limited number of plants to be grown. Two of the simplest were constructed as follows.

The first was formed of a standard cold-frame sash and two narrow storm windows. The latter were secured to the sides of the window, on the outside, so that they stood out at right angles, and the sash was screwed firmly to these, thus making a glass box outside of the window. Top and bottom were then added, the latter being given slant enough to carry off water and melting snow. (Ordinary plowed and matched ceiling boards, covered with a high grade of roofing paper, answer this purpose, the roofing paper being brought in under one layer of clapboards or shingles, to get a tight joint.) A pane of glass removed from one of the storm-window sides, and replaced by a light wooden frame of the same size, on hinges, furnished sufficient ventilation. Ordinarily the living room supplied enough heat, but a kerosene lamp, placed in a metal box for safety, gave ex-

tra heat at night when needed. Removable shelves were fitted at intervals onto cleats supported by the sides, so that a goodly number of plants were accommodated.

The second was made on much the same principle, but was formed of two cold-frame sashes, one of which was carefully sawed and cut (with a glazier's diamond, the glass being cut first) from inside of one corner to a corresponding point, diagonally from corner to corner. This gave the two sides; the other sash forming a slanting roof from the top of the window to the outer edge of the bottom, placed just below the window, and supported by stout braces. Heat in this case was supplied by a small gas stove in the cellar below the window, covered by a metal hood from which a hot-air flue led through the wall, and then up through a wooden box to the bottom of the "conservatory." A very small pipe, running from the regular steam or hot-water system, will do equally well. Or a small lamp, properly protected, may be made perfectly safe, and will heat a small space of this sort at an unbelievably little cost. When a lamp is employed, however, very strict attention must be paid to ventilation.

A Convenient Plant Shelf

If the plants are wanted in the living-room itself, then make a substantial shelf for the window in which they are to be kept. This can readily be attached in such a way that it can be taken down in summer. The shelf should be formed, preferably, of a single piece of well-dried cypress or pine, that will not warp, with lath or furring strip planed smooth, or moulding neatly and tightly nailed about the outer edge, and projecting an inch or so above the upper surface. By painting the edge thickly with white lead just before nailing this on, a tight joint will be secured. The shelf or stand itself should be painted with "outside" white. If this shelf is covered with a layer of moss, and on top of this clean white pebbles, it will not only look much more attractive than a plain board support, but the pots, while having

perfect facilities for draining, will not dry out so quickly, and the surplus moisture absorbed by the moss—instead of running down to water the roses in the carpet on the floor!—will evaporate and help to keep the air about the plants normally moist. Even with an inside shelf of this kind, it is not a difficult task to shut off a separate space for the flowers by arranging curtains which may be pulled about them, giving much better control of the conditions of moisture and temperature, and making it possible to fumigate the plants with tobacco smoke, if necessary.

Provide Now for Next Spring's Needs

In addition to these details of construction, do not forget to provide yourself with all the materials which may be needed before open weather in the spring in the way of soil, sand, fertilizers, leaf-mould or chip-dirt, sphagnum moss, etc.—anything that is likely to be required for repotting, starting cuttings, starting plants from seed, and potting up new plants. All these things may be kept in boxes in the cellar, out of the way, but readily available when needed. Keep them as far from artificial heat as possible, however, to avoid their drying off excessively.

November: Second Week

FRUITS AND VEGETABLES IN STORAGE; ODDS AND ENDS OF OUTSIDE WORK; ROOTS FOR FORCING; "BUDS" FOR GRAFTING; MAKING BEDS AND BORDERS FOR SPRING PLANTING

Before the advent of real cold weather make certain that you have collected and put into their final winter quarters all vegetables and fruits which may have been stored temporarily in the hurry of harvesting. A careful "going over" at this time of such things as apples, pears, squash, onions, and cabbage, and—if you have had any to keep—melons, tomatoes, and cauliflowers, will be of double value: not only will you be sure that they have been stored as carefully as possible, but you will have a chance to weed out, and set aside for early use, any which may not be perfect specimens. Any lot of fruits or vegetables, no matter how carefully they were selected at the time of harvesting a few weeks ago, nor how perfect they appeared, will have some specimens which by this time may be readily picked out as those which will be the first to cause trouble, even if they have not already begun to do so. Any effort spent now in culling out such "seconds" will be well worth while. One apple slightly bruised in harvesting, and decaying, will quickly contaminate a box, or even a whole barrel-full, if it is not discovered in time. The same is true of the other things mentioned. Make sure that everything you put away is in good sound condition before it is finally "O. K'ed," and given its place on shelf or in bin.

Another thing which is frequently neglected in connection with winter storage is the matter of ventilation. Fresh air is good for the things you have stored, especially if they

are kept where moisture collects, even to a small extent, as it does in most cellars and dark store-rooms. Open up windows or doors every week or two on a bright dry day, or for a night, if it is not too cold; and don't forget to keep this up, at intervals, during the winter. Most vegetables, and fruits, will keep best in a cold temperature—about 35 degrees—where the air is not too dry. Squash and sweet potatoes, however, keep better in a rather warm temperature,—45 degrees or over—and a very dry atmosphere: a place near the chimney in the attic, or in the cellar near the heater, furnishing the right conditions.

Clean up the Outside Jobs

Take advantage of every warm bright day to clean up any outside jobs there may be left to do: any day now may bring weather conditions which will mean the cessation of work of this kind.

Don't leave until spring any garden debris or rubbish that can be cleaned up or burned up now. The vegetable garden that is left full of dead vines and pea-brush and tomato and bean poles, is not only the most desolate of sights and the most aggressive signboard of slipshod methods, but a pleasant and safe winter resort and encampment for all sorts of insects and disease spores.

In making the final rounds of inspection, look carefully over your fruit trees, and small fruits. Go over the cane fruits—blackberries, raspberries, etc.—and cut out all old canes that fruited this year, if they have been left till now. Cut out and burn any new ones which show signs of borers. Carefully examine currants and gooseberries for borers also:—a light-colored slightly wilted shoot will enable you to recognize where one is present. The bushes may be thinned or cut to shape now if desired, but as a general rule it will be better to leave pruning until late winter or early spring. Grapes however may be pruned now to advantage, as soon as other outside work has been attended to.

Late summer and fall flowering shrubs and ornamentals may be pruned now if there is likely to be lack of time for doing this work in the early spring; the advantage in waiting until the latter time is that winter injuries and killing back may be attended to at the same time.

A Stitch in Time for Spring Repairing

Trellises or other supports for grapes and trained fruits should be looked to now before the ground freezes, and any needed repairs made. If this is put off until later there is more danger of damage from winds and snows. If any new wire is to be used, get the kind known as "spring coil," as this will remain tight at all times, while ordinary wire soon sags. If you will examine an old trellis you will see that decay almost always starts around the nails. Paint all nails and joints with white lead, and keep the whole trellis painted every other season or so, with some neutral color.

Espalier or lattice trained fruits are often planted in warm, sunny, sheltered positions: if against a wall the support for them should be a foot or more in front of the surface of the wall, so that there may be room for the air to circulate freely back of them. In such a situation injury is often caused either during winter, from bright sunshine, or growth is started prematurely in the spring, and damage done by late frosts. Protection against these possibilities may be had by thoroughly mulching the soil about the roots after the ground freezes, and by shading the tops with a screen of evergreen boughs: such a screen is not unsightly, and may be constructed quickly and easily by lacing the boughs through a few strands of stout wire placed a few feet in front of the plants to be protected.

Small fruits, growing in an exposed position, where experience has shown there is some danger of winter-killing, may be protected by evergreen boughs so placed as to shelter them from prevailing winter winds. In very cold climates, the cane fruits are given winter protection by laying them down—first loosening the roots with a fork, if necessary—

and holding them in position by shoveling some soil onto the tips: this must be removed as soon as possible in spring.

Get together now all the material you will need for winter mulching during the next few weeks. For the hardy borders, bulb beds, box-wood edgings, rose beds, less hardy shrubs and vines, etc., well-rotted, *dry*, strawey manure is one of the best things to use. Gather up fallen leaves and keep them in a dry place, as they will be useful for many purposes, and any surplus will be valuable for composting with manure for hot-bed material, and supplying humus for garden, frames, or potting soil. For the rose garden, where the bushes have to be protected above ground, dry leaves are excellent. Procure a generous supply of evergreen boughs; they are useful for many purposes in putting the garden to sleep for the winter. For strawberry beds, covering for frames, etc., bog-meadow or salt marsh hay is the most desirable material—it is free from weed-seeds, inconspicuous, and stays put. If that cannot be procured, get rye or oat straw. Get as much as you are likely to need of all these things in advance, and have them where they will be ready to use, under cover and dry, when things freeze up for keeps:—remember that the purpose of mulching is to keep things frozen, not to protect from frost.

Roots for Forcing

Before the ground freezes hard, take up a supply of rhubarb, asparagus and sea-kale roots for forcing under the greenhouse benches or in a hot-bed, during the early winter and spring months. Use a sharp spade—or cut down about them before lifting with the lawn edger or a hay-knife—and remove them with a generous lump of soil, kept as intact as possible. The safest way is merely to cut about and under them, making *sure* that they are loose, and then leave them where they are until they freeze solid, after which they may be moved to some cold shed where they will remain frozen, but be get-at-able when wanted.

Increase Your Orchard by Grafting

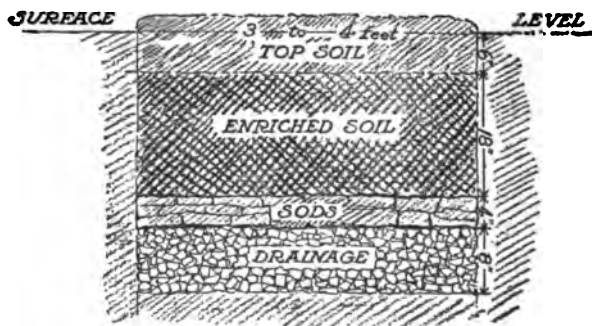
Have you as many varieties of fruit growing on your orchard trees as you would like? and are all that are growing perfectly satisfactory? If not, it is an easy matter to add new varieties or substitute them for unsatisfactory ones, without increasing the number of trees. The actual operation of grafting—or of budding, which is similar—is not performed until early spring (next March or April), but it is well to decide now what you would like to do in this line, and provide yourself during the next month or so with “whips” of the various varieties you may wish to add to your collection. Right now, while the apple season is in its height, is the time to “sample” the different kinds, and make your selections—three bites of a good specimen will tell you more about the eating quality of that particular kind, as far as *your* taste is concerned, than pages of catalogue or book descriptions and “acid,” “sub-acid,” “mild,” and “tart” adjectives. Whenever you sink your teeth into an apple that particularly appeals to you, *find out what it is*, and then put the name down in black and white. Then find out, either from local growers or from your State experiment station or county agent, which of the several sorts you may have on your list will do well in your vicinity. The “whips” or small branches of “buds” may then be procured locally or ordered from a reliable nurseryman. In the former case, bury them, carefully tagged, in the cellar, or keep them in a cold, fairly moist place, such as an ice-house, so they will remain dormant until you are ready to use them. If ordering from a nurseryman, it will be more convenient to have them reserved until you want them.

Make a Rose Garden Now

There is still time in November, before the ground freezes hard, to prepare a rose garden for next spring's planting, and if you intend to set out any roses next spring by all means prepare the bed now. Of the thousands of roses set

out every spring, only hundreds go into beds that have been given thorough preparation. In spring there is never time to do the job so well as it should be done, and you will have lost the advantage of winter's action on the soil and the pre-digestion of the manure and bone, which make an ideal condition for spring planting.

Stake out a bed of the desired size, allowing eighteen inches each way for teas and hybrid teas, and twenty-four



inches for hybrid perpetuals. Select a position that is naturally well drained, sheltered if possible from north and northwest winds, but exposed in other directions, so there will be free circulation of air about the plants—an important point. Dig out the bed to a depth of two to three feet, the latter depth being necessary if artificial drainage must be added. Place the sod and the good soil in separate piles along one edge of the trench, and the poor soil and subsoil along the other edge. Break up the subsoil at the bottom of the trench with a pick.

First put in the drainage, if required—eight inches of coarse gravel, broken stone, old plaster, clean cinders, or any similar material. Over this put a layer of sods, grass side down, or long manure. Fill in to within six or eight inches of the surface level with good soil—the heavier the better—well enriched with rotted manure and coarse or inch bone. The last six or eight inches should be of soil that

has not been enriched, so the roots will be tempted to feed well below the surface. Make the bed a couple of inches above the surface, to allow for settling.

With such preparations made now you will have next spring, not only a bed that will produce superb blooms, but one that can be planted out in a few minutes after your plants arrive from the nursery. The same preparation may be made, to just as great an advantage, for a new flower border. In this case it will not be as essential—though of course desirable—to make the bed quite as deep, or be so particular about the drainage, as for roses.

November: Third Week

**PUTTING THE GARDEN TO SLEEP FOR THE
WINTER: PROTECTION OF ROSES; SHRUBS;
BULBS; PERENNIALS; SMALL FRUITS.
CHRYSANTHEMUMS FOR STOCK PLANTS;
MATERIALS FOR SPRING WORK INDOORS**

One of the last things to be done outside, and one of the most important things for the success of the garden, is to put to bed for the winter plants that require protection—to apply mulching where it is needed, in the right way, at the right time.

Mulching is used to protect plants from thawing rather than from freezing. Consequently care should be taken that it is not applied too soon. Nothing that is hardy enough to survive in the open ground will be injured by the first few cold snaps of autumn—in fact, Nature provides for this as a process of ripening that the plant should go through in order to do its best the following season. As a general rule the mulch should not be put on until the ground is frozen hard and severe weather appears to have set in.

Winter injury to plants is usually due to one of three conditions: Alternate freezing and thawing; heaving of the soil, causing exposure of the roots; and too severe freezing of tops or roots. The latter condition is seldom the cause of damage.

It will often be as late as the middle of December before the mulch is required, but the materials should be obtained at once. There are several good materials for mulching, any of which may be obtained with little trouble in most localities. Stable litter, or thoroughly dry stable manure, will serve both as a mulch and a valuable source of plant food. Marsh or meadow hay, or grain straw, may be utilized; the former stays put better and is not so conspicu-

ous. For the small place in the city or suburbs leaves may be used. Evergreen boughs are also well worth having, either to hold leaves or other mulching in place, or by themselves to provide protection, especially where the climate is not very severe. These boughs are also good for tying up plants that need protection above ground, being much more attractive in appearance than unsightly straw jackets.

The Neatest Mulch for Beds and Borders

For covering beds or borders about the house, or wherever a particularly neat, trim appearance is desirable, run a strip of twelve-inch chicken wire round the edges of the bed, holding it in position with small stakes every five or ten feet. Fill this with leaves to the desired depth, placing a few boards or boughs on top if the winds are high to hold the mulching in position until it becomes settled. The wire should be put in place before the ground freezes; the mulch may be put on at any time afterward.

Both ground and mulching material should be dry when the mulch is put on. Though the ground will dry off very quickly on a bright day, the mulching material, if once wet through, may freeze, and in any case will require several days to dry out. Therefore it is best to keep it under cover if possible until wanted.

Winter mulching is required in many places—in the flower, fruit and vegetable gardens, on newly planted borders, on the bulb beds, and round newly set shrubs or trees. After hard frosts have killed the foliage of the late-flowering hardy perennials, such as chrysanthemums, asters and anemones the borders should be gone over with a scythe or sickle, and the tops cut down to within three or four inches of the roots. Burn this dead material, as one can never be certain that disease spores or insect eggs or cocoons will not be harbored to make trouble next year. Manure makes a good mulch for the hardy border, as a large part of it may be worked into the soil about the plants in the spring.

Protection for the Roses

Some of the hybrid-perpetual and hybrid-tea roses are hardy enough to go through the ordinary winter without protection, but it is best to mulch the whole rose bed. In a severe climate, or where tender sorts are grown, the earth should be drawn up round the canes in little hills before the ground freezes. This not only gives extra protection, but also insures better drainage. Before putting on the mulch it is usually advisable to cut back the longer shoots by a third or so. This applies especially to the taller, stronger-growing rose bushes, as it not only makes them less in the way, but lessens the danger of their being whipped and beaten about by the winds. The regular pruning, of course, is not given until spring. Tea and hybrid-tea roses, that need more protection than the usual mulching affords, may be put into winter quarters by running a strip of wire round the bed, as already described, and filling this with leaves to the depth of a foot or more. This method, with evergreen boughs laid over the top, will carry through most teas, even where the winters are severe.

The shrubbery border should be mulched, especially during the first winter or two after planting. For this work it is better to use rough manure or leaves in preference to straw, so the material can be worked into the surface soil in the spring, making a drought-resisting summer covering. As the mulch for shrubs is to keep the soil from heaving, rather than to protect the plants, the soil about each shrub should be well covered; but the mulch should not be crowded up round the stem or trunk of the plant, where it may furnish protection to field mice or other rodents to the injury or even loss of the shrub. This is an additional reason why the mulch should not be applied before the ground freezes, as by that time these marauders have made their winter quarters elsewhere.

Some of the native hardy lilies are safe without protection, but most of the others, such as the hardy Japanese sorts,

the candidum or Madonna, the longiflorum, and the speciosum, are better for protection, especially when they are growing in dirt beds. Any bulb or plant naturalized among shrubs or in grass is mulched to some extent by Nature. Beds and borders of spring-blooming bulbs—tulips, narcissuses and hyacinths—should also be thoroughly mulched.

Winter Mulch for Strawberries and Fruits

In the fruit garden and in the vegetable garden mulching is also required. For strawberries nothing is better than clean marsh hay, which is free from weeds, stays in position well and makes a clean, dry ground covering for the fruiting season. Straw is more likely to blow about over the rest of the garden in spring, and to become an endless nuisance by catching in the wheel-hoe teeth through summer. In cold parts of the country the whole surface—the ground between the rows as well as the plants—should be covered to a depth of several inches. In more southerly sections, especially when the rows are far apart, mulching over the plants alone will be sufficient.

The small fruits—the cane fruits, currants and gooseberries—are benefited by winter mulching, which, in their case, is of double value, as it may be utilized again for a summer mulch after the plants have been cultivated or hoed out in spring. All plants of this class suffer from dry weather at fruiting time, and as it often happens that one is too busy to provide a mulch just when it is needed, it pays to put it on now and have it ready, in addition to getting the benefit during the winter. Late plantings of onions or spinach, to be carried over winter for spring use, should also be mulched; hay or straw is better in this case than leaves or manure, as it may be removed more readily in the spring.

All newly planted shrubs or trees, or newly made beds, should be mulched. Be sure that the surface of the bed, or the soil about the trees, has enough slope to drain itself readily before the mulch is put on. Otherwise water may

collect, resulting in a frozen mass of ice and mulch that injures the plant, or keeps the ground about it frozen in spring until long after the rest of the garden has thawed out.

Winter Protection for Tall Plants

A number of plants require protection different from, or in addition to, that afforded by mulching. Some of the tenderer roses and shrubs, which might be injured by severe weather, are jacketed with straw. For this purpose evergreen boughs, or clean, long rye straw and tarred string should be used. A good way of putting on a jacket of this sort is to have a number of adjustable corn ties to use while getting it on and making it firm and snug, then to wind securely with tarred twine, when the corn ties may be removed for the next plant. Still other plants, such as hardy azaleas, or fruits trained against the south side of a wall, may need protection from the sun and to prevent premature swelling in the spring. A mulch on the ground will, of course, tend to hold the roots back, but a sun shield is sometimes also required. Such a shield may be constructed by putting up stout posts, of any height required, stretching across these a few stout wires, and interlacing evergreen branches. A similar fence may be made to serve as a wind shield.

The more tender roses and standard or tree roses, which are more susceptible to winter injury than the same varieties grown in bush form, may be given efficient protection in severe climates by being taken up, roots and all, and wintered over in a trench or a deep frame, covered with hay or straw, with a foot or so of soil on top. If the ground is very dry give the soil round each plant a thorough soaking with the hose the day before taking up. Cut down about each plant with a sharp edger or spade that will cut the roots off clean and leave a good ball of earth. Climbing roses may be laid down, the tips being held in place with earth or a notched stick, and covered with mulch or dirt. In this way many of the beautiful semi-hardy climbers may

be kept quite far north, and the hardy climbers up into Canada.

The tender hydrangeas and the old-fashioned century plants should be carried over winter in a cool greenhouse, or a partially lighted cellar or cold room, where the temperature will average between thirty and forty degrees. Give only enough water to keep the soil from getting completely dried out.

Select Chrysanthemums Now for Stock Plants

If you grow or would like to grow chrysanthemums, now is the time to select stock for next fall's blooms. If you have some of your own carefully tag a plant or two of the best sorts before the blooms are cut. Try to take in one of the flower shows, and note some of the newer sorts that appeal to you. At any rate make up your mind to try a few next year. You may grow the big single blossoms, the medium-sized flowers, or the small blooms in sprays, as you fancy.

If you haven't a greenhouse the chrysanthemums may be grown in pots during the summer and brought in at the approach of cold weather, flowering indoors at the very season when other plants, after their shift from the outside garden, are recuperating and barren of bloom. In sections where the falls are late and mild the chrysanthemums may be brought to bloom under a protection of plant cloth.

It is an easy matter to get plants for stock, as there is always a surplus as the cutting season draws to a close. Pack the old roots into a box or flat, which may be kept in any cool light place, with an occasional watering to keep the soil from drying out, until January or February, when more water and a higher temperature should be given to start them into active growth.

Materials for Spring Work Indoors

This is the last chance to make preparations for starting seedlings and cuttings in the spring. Secure at once a

couple of flour barrels from your grocer. If you have no good compost on hand make a mixture of garden soil, adding sand if it is heavy and leaf mold or sod scrapings. Enough of this material—usually about a third, in bulk—should be added to the garden soil, or soil and sand, to make the resulting mixture very light and porous, and friable enough so that it will not lump when squeezed in the hand. A barrel or two of this soil put away in the cellar, or in some other place safe from freezing, will make the starting of seeds and plants in the spring, when the ground outside is still frozen hard, an easy matter. A surplus of the leaf mold or sod shavings should be kept to mix with the soil for the seed boxes, as this should be made more light and porous than that used for transplanting and potting. An hour at this job now will save you trouble next March.

November: Fourth Week

WORK FOR THE HOME TREE DOCTOR: HOW TO REPAIR OLD WOUNDS AND SPLITS; FALL TRENCHING AND DRAINING

The beginning of winter sees no cessation of work on the part of the industrious gardener. The ground may be frozen or covered with snow, but there will still be warm afternoons when there is keen zest in a few hours' brisk work in the open air. It is nevertheless unwise to put off these winter jobs, for the good days are numbered.

One of the first things is to put the trees, both fruit and ornamental, in order. Be your own tree doctor. For ordinary tree ills there is no necessity for a specialist. You will require only a sharp cutting-off saw, preferably newly "set"; a good strong knife; a mallet and two chisels, one half an inch and the other one and a quarter inches; some heavy paint, preferably crepsote; Portland cement and a small mason's trowel; a tree scraper, which may be improvised by nailing a flat three-cornered piece of metal to a short handle; and possibly a bitstock or an auger.

Decaying cavities in trunk or limbs are the most common injuries of serious nature. These are the results of former abrasions of the bark and the cambium layer, or living skin, of the tree; or of improper pruning. If neglected such decay will extend rapidly into trunk or limb until, in the course of a few years, the living wood will be destroyed out to the bark in every direction,—and when an unusual strain of wind or ice comes it will all be over but the crash! This decay is the result of disease spores or germs that have found lodgment and congenial conditions for development in some neglected wound, often a very slight one. It could have been prevented by proper precautions at the time of the infliction of the wound, or when the tree was pruned.

Repairing an Old Wound

The fixing of an old wound of this sort is sometimes a lengthy job, but unless the limb or tree is ready to collapse it can generally be successfully accomplished. Fortunately the real heart, or the circulation system, is near the outside, so the tree can flourish vigorously with an inner heart of stone.

One of the most common types of injury is illustrated in an accompanying photograph. Had this limb been sawed off close to the trunk and painted over, the bark itself would probably have closed in over it. The first thing to do in all rotting cavities of this kind is to cut back in every direction to clean, live wood and bark. In order to do this it may be necessary to cut away a good deal of live wood and bark round the mouth of the cavity; or, if the heart of the tree has rotted out too far down to be reached from the opening, it may be necessary to make another opening near the ground. But get out all the dead and partially decayed wood. If it is impossible to clean it all out by any other means a gasoline torch may be held against the inaccessible parts for a few minutes.

Then give the whole a thorough coating of creosote. Other paints with disinfectant action may be used, but creosote, being both sticky and penetrating, is especially good for this work. To have a perfect job the cavity should be filled to the last crevice and sealed air-tight. As the wood sometimes parts slightly from the filling at the mouth of the cavity a layer of elastic cement may be used to join wood and cement at the opening, but usually a heavy coat of paint will afford all the protection required.

The filling for the cavity should be a fairly rich mixture of sand and cement. For very large holes a regular 1-2-4 mixture will do for the bulk of the work, being finished off with cement and sand, one part of the former to two or three of the latter. If long vertical openings are to be filled a form may be made of stiff roofing paper, greased or soaped on the inside and made to conform to the shape and size

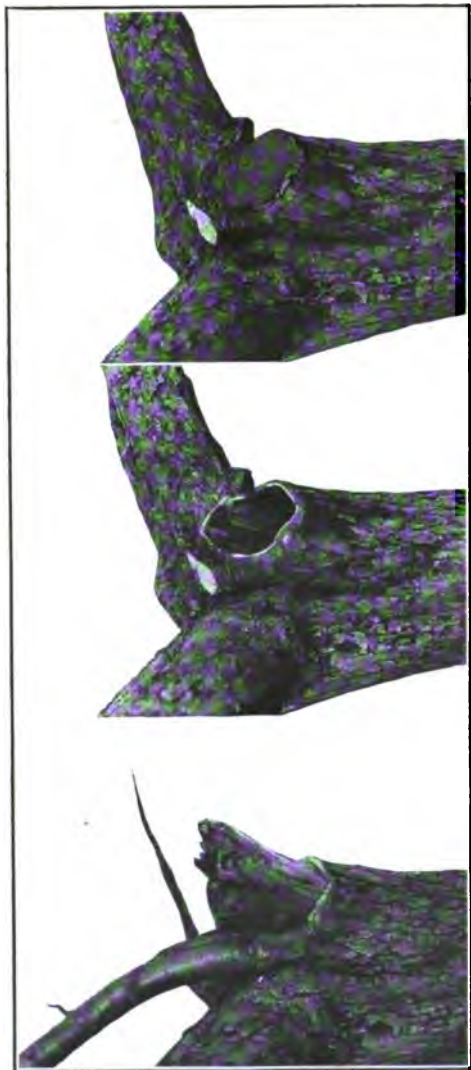


PLATE 27.—First aid to injured trees.—repairing an old, decayed wound, caused by improper pruning. First, all the decayed wood is dug out back to live tissue. Then the cavity is scraped clean and disinfected. Then it is filled with concrete, and the raw edges of the wound painted over with a creosote paint.

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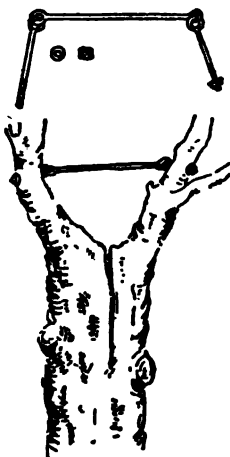
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of the tree. The filling should be built out just level with the inside of the bark, which will grow over the cement with remarkable rapidity. Sometimes, to fill the cavity to the top, it is necessary to bore a hole from above and to pour in the wet concrete. After the filling is in place carefully paint over any exposed wood, especially where it comes in contact with the cement.

Care should be taken not to use cement just before a freeze may be expected. A newly finished job, however, may be protected from several degrees of frost by tying a heavy blanket or some old sacking over it. Do not let the cold prevent your cleaning out and painting the wounds now. In the spring, after further treatment if required, the filling may be put in in a few minutes.

How to Mend a Split

Next to decay, splitting from wind or ice or over-fruiting probably causes more damage than anything else. Besides the breaking apart of limbs there is usually more or less injury to the adjacent bark. In cases of this kind the limbs should be put back into their proper position as soon as possible by tying heavy chains or ropes round them—protecting the bark with old sacking or slats of wood—and twisting these tight with an iron or stout wooden bar. To hold the damaged limbs in place permanently it is well to have made iron rods of the right length, with ring bolts at each end. Extra large washers, which may be slightly countersunk into the outer surfaces of the limbs, should be used for the bolts. All injured parts should be cut away and the surfaces painted thickly just before the pieces are drawn tightly into place, as shown in the drawing on this page.



Protect Your Young Fruit Trees

Do not neglect to protect trees from injury. Guard the roots of young fruit trees from bark injury by rabbits or other rodents. Earth should be drawn up in a mound round the trees just before freezing weather. Newly planted trees so situated that they may be injured by wagon wheels should be protected by strong stakes driven about a foot distant, to which they may be held lightly by bands of burlap or pieces of old rubber hose, but not by string or wire. Trees near the curb, where horses may get at them, should be protected by wire guards. Older trees may be used as hitching posts without danger of injury by the simple expedient of putting a screw ring or a short chain and snap into one end of a short stake and securing the other end to the tree by two stout staples, allowing the stick to hang down out of the way when not in use.

Limbs that have been broken should be cut back to the trunk or the parent limb of the tree, and the scars, if more than an inch or so in diameter, should be painted over.

Grading Around a Tree

Sometimes fine trees are injured in grading work. Earth is filled in directly against the base of the trunk. To overcome this danger a low wall may be built round the tree, a couple of feet or less distant, and up to the grade line. If the ground can be given a slight pitch in all directions from the tree, and the soil below it is well drained, this is all that is necessary. If from the nature of the soil or the grade there is danger of water collecting at the foot of the tree, a circle of drain tiles should be laid about it with several connecting lines or spokes extending from the base of the pit, so that any surplus water will be distributed through the tiles over a considerable area.

Forcing Roots Indoors

Before the ground freezes hard prepare some asparagus and rhubarb roots for winter forcing under the bench in the greenhouse or in a warm, fairly light cellar. With a

sharp spade cut round and under some of the largest and oldest crowns. Good balls of earth should be secured with the roots, which should be taken out intact if possible. It is not necessary to take them up now; if they are simply loosened and left in the hole they will freeze solid, to be removed later, a few at a time, if a good supply is available.

This plan will not only give you fresh rhubarb for winter, but your bed will be benefited, for you will have room to take up and divide the remaining roots. If you have no outdoor bed from which to take roots a few may be bought at a reasonable price from some neighboring market gardener, or from your seedsman. But before forcing let them freeze.

Place a few roots in a tight, shallow box, pack moss, chip-dirt or coal ashes about them to help hold the moisture, water thoroughly, and place them where they will have a moderate degree of heat. In cutting the first shoots of asparagus be careful not to cut through the other buds that are just starting.

If you have grown a supply of Witloof, or French salad chicory, take up the strongest roots, trim them back to a convenient size, and plant them in a box of sand or sandy soil, covering them well. With warmth and plenty of moisture in a dark place, the new growth of leaves sent out will be tenderly blanched and will make a delicious salad at the season of the year when fresh salads are scarce. Or the roots may be placed, upright, in a frame, covered with soil, and a layer of warm manure put over this, to stimulate growth.

Drain Now to Save Time in Spring

After all the other fall work is cleaned up there is usually a chance before hard freezing to do a lot of work that will save time next spring. For some time past both spring and fall in the East have averaged later than in former years. In several recent seasons we have been able to plow almost up to Christmastime, but our spring operations have been delayed from one to three weeks.

If you have any patch of land that is cold and backward in the spring, remaining too wet to be worked when you would like to be getting ready to plant, by all means drain it now. A few dollars' worth of drain tile and a couple of days' work by an ordinary laborer under your supervision will vastly improve a considerable sized garden patch, and you may have the satisfaction of knowing that such soil is usually the best after it is properly drained.

The tiles should be put down as deep as possible, at least two feet, preferably three, and if possible four. The lines of tile should be about twenty-five feet apart for a three-foot depth, and may be forty feet apart for a four-foot depth. The extra foot in the depth of the trenches pays well.

In laying out the lines for the ditches locate the highest and the lowest points of the piece to be drained, and see that the tile, slopes slightly *but without any exceptions*, in the right direction. After the tile has been put in and before the ditch has been filled with the soil it will be well to test the system in two or three places with pailfuls of water.

Fall Trenching

In gardens small enough to be worked by hand thorough "trenching" will pay well. Instead of spading up the garden in the ordinary way throw out a furrow or ditch one spade deep across the plot. Then go over the same strip again, spading up and thoroughly breaking the lower soil, but leaving it where it was. Throw the next strip of top-soil on this, and in the same way thoroughly pulverize the strip of soil beneath it; and so continue to the other side of the piece. If you can give the surface a good dressing of manure before trenching by all means do so. You will then have your garden in the finest possible shape for next spring's planting—the manure well below the surface and largely converted into available forms of plant food, and the surface soil ready to work up fine as silk after the winter's disintegrating action on the soil particles. By the same token late fall plowing is desirable, except on slopes, where the soil may wash during heavy rains.

December: First Week

THE WINTER WINDOW GARDEN: VENTILATION; MOISTURE; SOIL; CARE. PROPAGATING BUSHES AND SHRUBS

Something more than an appreciation of their beauty is required to make plants succeed in the house. It is comparatively seldom that one sees really good specimens even in the living-rooms of those whose outside gardens are a summer-long delight. The cause of failure is generally lack of realization of the change of environment under which the plants must be grown, rather than ignorance of their general requirements. The matter of being regular in the care of plants in the house is the most important step to success. Only a few minutes a day need be given, but those few minutes should be given every day. If you are not willing to concede this much attention at the outset you would better let the florist see to the growing of your plants.

Devotion and regularity alone, however, will accomplish nothing. In addition you must provide a suitable place in which to keep the plants; kinds and varieties that are suited to the conditions under which they must be grown; and common sense, mixed with some experience, in their care.

The matter of a suitable place is open to some discussion. Many persons have the idea that if the room is only kept hot enough the plants will grow. They could make no greater mistake. A suitably high temperature is necessary, but other conditions just as essential are light, adequate means of ventilation, and moisture in the air.

Light and Temperature

Most of the flowering plants and many of the others should be given all the light possible during the winter

months. Direct sun through a south window is sometimes too extreme, but this may be modified by drawing a thin white curtain across the upper part of the window. A sunny window is decidedly desirable for the geranium and some other flowering plants, but others, such as the begonia, will do well in indirect light or in partial shade, and still others, such as the fuchsia, should be kept out of the direct sunlight.

So far as temperature requirements are concerned, plants suitable for indoor culture may be divided into two classes: First, those that will thrive with a night temperature of forty-five to fifty degrees; second, those requiring fifty to sixty degrees. If it is not possible to have two rooms or two windows where a difference in temperature may be maintained, more satisfactory results will be had by selecting all the plants for your window garden from either one class or the other. A drop of five or ten degrees for a few hours, on an exceptionally cold night, will not prove fatal, but many repetitions will severely check the plants and keep them in a practically dormant condition. The day temperature may range from five to fifteen degrees higher than the figures given.

Plants Must Have Fresh Air

Two facts that the grower of plants in the house is likely to overlook are that fresh air and normally moist air are as essential to the plants' continued good health as are warmth, light and watering.

Neglect of these two things undoubtedly causes the great majority of house-plant troubles, either directly or indirectly, through the fostering of insects and disease. For best results the plants should be given *fresh air every day*, with the very occasional exception of very cold, windy or stormy days. The more indirect the ventilation can be, the better, so long as it is thorough. Direct drafts should be avoided. Fresh air from an adjacent hall, or from a window in the next room, with a window in the

plant room opened at the top to allow the escape of dead air, makes an ideal arrangement, and one that incidentally will be very beneficial to the human as well as to the botanical inmates of the room.

Next to the variations in temperature the chief drawback to growing plants in the house is the burned-out condition of the atmosphere. Steam, hot air and hot water all rapidly dry up the normal amount of moisture in the air. A certain degree of air moisture, however, is just as essential to plant growth as is soil moisture. The only sure way of keeping the air moist is to have a special place, large or small, for the plants, that can be regulated independently of the living-room. When plants are kept in the living-room, however, moisture can be maintained to a satisfactory degree by frequently changing the air and by keeping bowls or pans of water on or near the stoves or radiators, where it will evaporate. Another thing to be kept in mind is to select a place for the plants where they may readily be got at, watered and cared for. Inaccessibility is frequently one of the causes of troubles; bugs get a start or pots dry out before one notices; or because of the trouble of tending them the plants are neglected.

If you plan to keep anything more than a rubber tree, a fern dish or a single geranium in your winter window garden it will pay to fix a place of suitable size that can be shut off from the rest of the room temporarily when required, and where watering can be done without making a muss. If you have a bay window that can be devoted to the purpose and that can be shut off by glass doors or heavy curtains, nothing better could be asked.

A Window Conservatory

If you cannot use a bay window, here is a simple plan that will be found satisfactory: Secure a wide cypress or white-pine board an inch thick and as long as or a little longer than the window. Round the edges nail thin strips

about two inches wide, flush with the bottom and projecting an inch or so above the upper edges of the board. Stain or paint this to match the window frame and give it a heavy coating of spar varnish. Get two stout brass brackets and fasten the shelf to the window frame in such a way that the window may be opened, and the window shade drawn down inside the shelf. If desired a similar shelf, but preferably a narrower one, may be placed at a suitable distance above it.

To the top of the window fasten a small rod upon which a curtain may slide easily. This support, which should project far enough so the curtain will hang outside the plant shelf, may be made of two heavy sockets strong enough to support the rod and the curtain, two short end pieces, two elbows and one piece of rod or tubing the width of the window or of the plant shelf.

A layer of sphagnum moss topped with white pebbles or with clean, coarse gravel, into which the pots can be sunk, will look neat, will absorb surplus water and will keep the plants from drying out as quickly as they do on unsightly saucers. The shelves may be taken down after the plants are set outdoors in spring.

An ordinary window may easily be converted into a miniature plant conservatory. A storm window placed outside the regular window forms the front, two narrow windows of the desired width form the sides, and inch boards covered with roofing paper and painted to match the window trimming, form the roof and the floor of this simple but roomy little bay.

Soil for Potted Plants

Soil for most house plants should be light, friable and moderately rich. The ingredients may be good garden loam, sifted leaf mold or decomposed sod, sand, and a little bone meal—about a teaspoonful to a four-inch pot. Geraniums do well in a heavier soil. Ferns, begonias and other plants with root growth of a fibrous character do well in a lighter mixture—that is, more leaf mold or sod

in proportion to the loam. Pots more than three or three and a half inches in diameter should be supplied with drainage material—a few pieces of broken pot so placed that none of them will lie flat across the hole in the bottom and clog it up, and any rough, porous material on top of them.

As to daily care of plants in the house remember it is just as easy and as fatal to overdo as to underdo. Don't "fuss" with your plants. They should be looked after every day and examined every few days, but the less they are handled the better, except for occasionally turning halfway round so they will not be drawn toward the light and made one-sided.

The surface of the soil in the pot should be stirred occasionally. Weak liquid manure may be fed to advantage to the plants, especially when they are blooming. Nitrate of soda, used at the rate of a tablespoonful to a ten or twelve quart watering can, is excellent for this purpose. Fine bone flour, sprinkled on barely to cover the surface of the soil and worked in with an old spoon or a knife is also effective, and these two make a combination containing nitrogen and phosphoric acid in forms that will be both immediately and gradually available. Unleached wood ashes may be mixed with the plant soil to form a source of potash.

Give your plants water only when needed; then water thoroughly. To find just how much to give knock some of the earth balls out of the pots ten or fifteen minutes after watering and see if the water has soaked clear through to the bottom; if it has not you are not applying quite enough moisture. If the soil in the pots becomes dry enough to get hard stand the pots in a basin or tub, partly filled with water, until it becomes moist.

Keeping Plants Healthy

One of the important secrets of success is to keep your plants clean—free from both dust and bugs. Close the doors or curtains of the plant-nook whenever the rooms are

being swept or dusted. Every week or two syringe both upper and lower surfaces of the leaves of the plants with clear cold water. For this purpose a hard-rubber, goose-neck sprinkler costing seventy-five cents or a dollar is very convenient. If you have only a few plants they may be set in a sink or a tub for this operation.

Palms, rubber trees and other large-leaved plants should occasionally be wiped off with a moist, soft cloth. Do not use olive oil or try any other stunts to make the leaves clean and shiny, as this will clog up the pores, which is just what should be avoided. Cut off promptly all dead leaves and flowers and any leaves that show signs of disease.

Plants that are carefully looked after and given an abundance of fresh air will seldom be troubled by insect pests. Avoid furnishing your enemies congenial conditions, such as overcrowding, overheating, poor light, dryness—in fact anything that will have a tendency to check or weaken the growth of the plants. The insects most likely to be encountered inside the house are the green aphid or plant louse; the “mealy bug”—a soft-bodied scale that hides under a white covering resembling a minute tuft of cotton; the white fly; and the red spider, which is about the size of a grain of pepper, infests the under sides of the leaves and is indicated by a light green color of the foliage, with minute yellow spots. Nicotine sprays, kerosene emulsion, etc., are as effective indoors as out. The plants should be watched carefully, and a suitable remedy used at the first sign of trouble.

The quickest, simplest and cleanest remedy for any of these pests is a hot bath. This can be given readily when only a few plants are to be treated. Dip them quickly, several times in succession, into water heated to 140 to 160 degrees; rinse them off in clear, cold water. In applying this treatment for the white fly do it when the plant is quite cold, and the insects are dormant. Other remedies are: Nicotine in one of the several trade forms that simply have to be diluted with water and applied; tobacco dust, which is specially good as a preventive; and kerosene

emulsion for scale and for the sucking nymphs of the white fly. Cold water applied with as much force as possible will help to dislodge the red spider; a small brush dipped in alcohol or kerosene will quickly dispose of the pernicious mealy bug.

Propagating Bushes and Shrubs

If you have use for any more grapevines, gooseberry or currant bushes, or such shrubs as deutzias, weigelas and forsythias, you can propagate your own. All these things may be bought at reasonable prices, but it is fun to do the work yourself. The cuttings should be six to ten inches long, and made of new growth that is ripe enough to be firm. At least two buds or pairs of buds should be taken in each cutting, the bottom one being quite close to the lower end. These cuttings should be placed in a small box of sphagnum moss, sand or sawdust in the cellar. For convenience, if you are making several of each sort, tie them in small bundles, carefully tagged. This winter storage allows the cuttings to callus and to undergo other changes that make them ready to root quickly when set out in spring.

Set New Varieties of Flowering Plants Now

Every enthusiastic gardener likes to add to the collection of flowering plants the newer varieties. Frequently, however, these cost in the spring from two to five times as much as standard plants of the same size. If you are keeping plants in the house and have room for a few additional pots, buy now small-sized plants of these newer things, and grow them on during the winter. This will give you not only several additional months of enjoyment, but also good stocky plants at half or quarter what they would cost you if you waited until May or June. If you are near a florist you can generally buy small plants of these newer things and have them repotted when you get them; they will then grow without further attention, so far as pots are concerned, for some months.

December: Second Week

THE WINTER CAMPAIGN IN ORCHARD AND GARDEN: WINTER SPRAYING; WINTER PRUNING OF FRUIT TREES; CANE FRUITS AND SHRUBS

Early winter is the ideal time to catch many of the orchard and garden pests off their guard. They are in a torpid state and can be located more readily. We can also use much stronger sprays on dormant trees than we can use in summer, and the absence of leaves makes possible a much more thorough and convenient job of spraying.

The work may be done at any time from fall until growth starts in spring, but the best time is now. We may have one of those remarkable Indian summers running almost up to Christmas, but remember what kind of weather we are likely to get in January, February and March, and do your Christmas spraying early!

The outfit required for the home grounds, the fruit trees and garden, is simple. In addition to your regular knapsack or compressed-air garden sprayer you need a spray pole, or a length of quarter-inch hose which you can fasten to a sawed-off bamboo fish pole, and one or two suitable spray nozzles. If you don't already own a knapsack or a compressed-air sprayer make yourself a Christmas present of one at once—not for winter spraying alone, but because you will need it every month, almost every week, to take proper care of your summer garden, flowers, potted plants, house plants, and so forth. Your sprayer should be equipped with an automatic valve and an anti-clog nozzle, then the starting and stopping of the spray can be controlled with your left hand while your right is free to manage the pole and to direct the spraying.

There are a number of good nozzles on the market, but for operations on foot under the trees select one of the goose-necked or angle type. With this, a simple turn of the wrist will direct the spray in any desired direction and save a great deal of shifting from one side of the branch or tree to the other. A cup-shaped washer of stiff leather, three or four inches in diameter, that will slip tightly over the pole, will keep the spray material from running down the pole and up your sleeve; and a wooden handle made of soft pine, bored out just large enough to fit snugly over the spray pipe, and held in any desired position by a set screw (made of any ordinary screw with the end squared off), will make the handling of the pole more convenient. These can be made with jackknife and bitstock.

The Pests to Spray For

The orchard pests that we can fight successfully in winter are the various scales and scabs, though spraying now will help to control a number of the other insect pests, and will check still others by destroying cocoons, egg masses or dormant larvæ. Some of the scales are rather hard to find and all are very small and innocent looking in comparison with the serious damage they can accomplish. Here are some of the things to spray for:

San José scale, which is about the size and shape of the head of a small pin, with a miniature "crater" at the center of a full-grown specimen. When they have been allowed to multiply unchecked, plainly discernible colonies, or small patches of "crust," form on the branches. If any of your fruit showed small red-rimmed spots last fall they were the trade-mark of the San José scale.

Oyster-shell scale forms colonies that incrust small apple twigs and make patches on the larger limbs like the foregoing. The scale, however, is of a different form, being something the shape of an oyster shell, with a distinct point or head at one end.

Scurfy scale, about one-eighth of an inch long, resembles

the oyster-shell scale, but underneath the minute crust you may find small purplish-colored eggs.

Cottony maple scale attacks not only maples but numerous other ornamental trees. In early spring or summer it resembles small tufts of cotton at the outer ends of the branches. It winters over as an inconspicuous brown scale on the rough bark of larger limbs and branches.

Rose scale resembles the scurfy scale, but is lighter in color and attacks roses and cane fruits.

The saw fly has greenish, spiny larvæ that feed upon the leaves of the cane fruits. It is susceptible to winter spraying.

Winter Sprays and Spraying

The two specifics for winter spraying are lime-sulphur wash and miscible oil preparations. For use in the small orchard it is generally more convenient to buy sprays ready to dilute with water than to attempt to mix them at home. If you are not familiar with the different brands it will be a good plan to write to your experiment station for advice.

If you prefer to make your own lime-sulphur boil for an hour in an iron kettle four pounds of lump lime, three pounds of flowers of sulphur and five gallons of water, adding five gallons more water when ready to spray. Spraying is done preferably before the mixture has entirely cooled. A "self-boiled" mixture may be made by using lump lime, flowers of sulphur and water in the proportion of eight each of lime and sulphur and fifty gallons of water. Slake the lime in a little warm water, and when it is slaking freely sift in the sulphur and stir thoroughly until a thick paste results. Keep it covered until it is through "boiling" and then cool down with the remainder of the water, and use as soon as possible.

Success in spraying—with a reliable mixture—depends entirely upon the thoroughness of the job. Every square inch of surface and each crack and crevice must be entirely



PLATE 28.—New trees from old! *First*: tall, brushy apple tree, the result of several years' neglect. *Second*: after the first pruning, top lowered, decayed and surplus wood removed.



PLATE 29.—New trees from old! *Third:* Two years later: many, vigorous new, young branches, again beginning to get crowded. *Fourth:* Pruned again; much of the old wood left the first time, removed; a "head" of healthy, young wood, that can be trained into a low, spreading tree, on the old foundation.

covered or the work will avail little. San José scale, for instance, reproduces at the rate of about three billions a year; so a comparatively few scales left by careless spraying will very quickly get the tree back into as bad condition as it was before. One decided advantage that the miscible oils have over the lime-sulphur is that they spread and work more thoroughly into the crevices and under roughnesses of the bark.

The Important Work of Winter Pruning

Just as important as the spraying is the winter job of pruning. With the exception of a number of the flowering shrubs growing in borders or masses, and a few of the ornamental trees, every tree, bush and brier on the place requires attention in this regard if you aim for the best results. It is possible to keep them healthy without pruning, but you cannot get the best quality or the biggest quantity of fruit or flowers by letting the trees and shrubs alone. The plants will produce too much wood and consequently more buds than they can develop.

The equipment required for pruning is even more simple than the necessary spraying outfit—a sharp knife, a wide-set cutting-off saw, and a stepladder or light, long ladder. If you are going to buy any special tools a combined pole saw and pruning knife may be had for \$1.75, and will enable you to handle ordinary-sized trees from the ground and to do the work very quickly. A pair of pruning shears, costing from fifty cents up, is also a great convenience. Specially prepared creosote or tree paint may be had at a reasonable price, but ordinary outside heavy lead paint will do. All branches more than an inch and a half in diameter should, after being sawed off, be painted over to prevent decay before the bark has a chance to grow over the wound.

The first thing to remove in all pruning operations is dead, decaying, bruised or diseased wood. What you should cut away in addition to that will depend upon the

nature of the tree or shrub being pruned, and the result you are after. As a general rule, the danger is that you will do too little rather than too much pruning. When in doubt cut it off!

The amount of winter pruning that should be done on your fruit trees depends upon their age and previous treatment. Newly planted apple, pear, peach and cherry trees will require very little pruning if they were properly cut back when planted. From those that have been planted several years superfluous crossing limbs should be cut, and lateral growth, which will tend to form spreading, open heads, should be encouraged. Peach trees in bearing should be cut back severely. Old trees, especially apple trees, may be cut back very severely to advantage, but it is best to spread the pruning over two or three seasons unless a fair amount of good, live wood can be left to prevent too severe checking of growth.

Remaking an Old Apple Tree

Illustrations Number 28 and 29 show a middle-aged apple tree that had grown practically no good fruit for a number of years. It bore well the first year after pruning and spraying and has since come back very satisfactorily. In cases of this kind some of the larger sprouts or small, new, upright limbs are left to develop into new wood; then after these have had two or three seasons' growth more of the older wood may be cut away. Practically any old apple tree that is not entirely gone at the heart can be saved and with a few years' care made to produce excellent fruit.

In all pruning of old trees try to re-form the tree as near the ground as possible, in order to facilitate spraying and picking of the fruit. Old trees that are up in the air altogether can be brought back into captivity only by "dehorning." This process leaves nothing but the main trunk and the stubs of the main branches, the idea being to form practically an entirely new head upon this skeleton. Gen-

erally only a half or a third of the tree should be so treated at one cutting, and some experienced person should be consulted if this form of treatment is to be attempted.

Drastic Treatment for the Cane Fruits

The cane fruits—raspberries, blackberries, dewberries, and the various hybrids recently introduced—should also be severely pruned, or rather thinned. Next season's crop of fruit will be borne on canes produced this year. Old ones should all be cut out clean now if this has not already been attended to; the others should be shortened back slightly to lessen the chance of their being injured by whipping about in strong winds. Have your hands and wrists well protected when you tackle this job. In very cold climates it is necessary to lay down the more tender varieties, and in some cases even to cover them with earth to protect them during the winter.

These things are prickly, but some of the gooseberries are more so; yet they need severe pruning, not only to produce better fruit, but to make sure of any at all. Branches that bend over and touch the soil should be cut off, and the plants should be kept very open so that light and air can get to every part of them, as they are very susceptible to mildew. Currants will continue to bear year after year even if they are not pruned, but the quality of the fruit will be very greatly improved if the bushes are kept quite severely cut back. The best fruit is borne on wood that is two or three seasons old, therefore in pruning cut out any surplus new growth of the present season and wood that is four years or more old. Examine the remaining canes carefully for the borer.

Winter Pruning of Shrubs and Roses

Single or specimen shrubs should, after several years' growth, have a little of the old wood cut out each year to prevent overcrowding. The longer branches should be

headed in to maintain symmetrical shape. Regular pruning of rose bushes should be given in the spring. All that they require now is the heading in of any long, new canes that are likely to be beaten about in the winter's storms. In pruning shrubs at this time of the year it is well not to touch any of those that bloom in spring or early summer, as the flower buds are already formed for next year, and whatever wood is cut away will mean a corresponding loss in blossoms.

Keep a sharp lookout for the egg masses and cocoons of caterpillar or insect pests in your section. If you are not familiar with their winter costumes your state experiment station probably has a bulletin describing them. The tent caterpillar, which for the last two years has denuded wild cherries and unprotected apple trees throughout large sections of the country, may readily be destroyed in winter.

December: Third Week

THE CARE OF GIFT PLANTS AFTER CHRISTMAS: HOW TO KEEP THEM IN GOOD CONDITION AND SAVE THEM FOR ANOTHER YEAR. PICK OUT SHRUBS FOR WINTER BEAUTY NOW

It would be an interesting job for an energetic statistician to figure out how many thousand dollars' worth of potted plants and flowers annually find their way from the florists' shops to the ash barrels during the brief holiday period. Part of this loss is due to the fact that the plants used are unsuitable for saving for further use; but by far the greater part is due to the recipients' lack of knowledge as to how the plants should be cared for. If you yourself give plants as presents select the more substantial sorts, which may be kept for a season or for several years. Many of the plants that the florists display at Christmas have been in preparation for a year or more, and with proper care most of them can be kept in good condition.

Azaleas are perhaps the most beautiful of all the many beautiful holiday plants, but since their requirements are different from those of ordinary house plants, most of them perish immediately. A good azalea costs the person who gives it to you several dollars; it is worth saving, especially since, with proper care, it may be made to increase in beauty for several years.

After you have removed the florist's careful wrappings and examined the little card dangling from a lower branch, do not leave your azalea in the superheated atmosphere of the living-room, to be forgotten during the excitements of the following days. The little tree may be covered with blooms, and you will probably find that it also con-

tains a number of buds. If you do not take care of the plant these will wither and drop off, though with reasonable treatment they should nearly all make flowers for some weeks to come.

Keep your azalea in a cool place—that is the first step toward preserving it. There is very little danger of its being too cool. Give it plenty of fresh air; there is no danger of giving it too much so long as direct cold drafts are avoided. A gas-laden atmosphere will very quickly ruin such blossoms and buds as there may be.

By all means guard against the plant's drying out; it will require, while blooming, an abundance of water. The soil in which azaleas are potted is of such color and texture that it does not show lack of moisture so plainly as that used for other potted plants; furthermore, the fibrous roots are so thickly matted as to make the soil almost impervious to water once it becomes dry. The surest and easiest way to get the soil moist is to set the whole pot in a basin or a tub of water until it has absorbed all that it will. If the flowers begin to fade it is a pretty sure sign that the soil is getting too dry.

To Make Azaleas Bloom Again

So much for saving the flowers and buds that are on the azalea when you get it. An equally beautiful display during a large part of next winter is quite possible, but you should make preparations for next year's blooms as soon as this year's wither and fall. Secure from a neighboring florist, or mix for yourself, a soil made up of sand, leaf mold and garden loam in equal proportions, with rotted peat added to about double the bulk. Shift the plant to a pot only about one size larger than that in which it has been growing. Have the new pot thoroughly crocked or drained, preferably with charcoal. Break up the old ball of roots with the fingers, and shake off or wash off a good part of the soil. Place it in position in the new pot, sift in a little of the prepared earth round it, and ram it down,

hard with a blunt stick or the handle of a trowel; put in another layer of soil and treat it the same way. There is not much danger that you will pack the soil too hard, but there is much danger that you will not get it firm enough. It is not necessary to cover the plant any deeper than it was covered before; a few of the roots may show at the surface where they join the stem, but instead of hilling up round them let the earth slope up toward the edge of the pot, leaving a depression at the center. This will be a help in keeping the earth ball thoroughly wet.

After repotting the plant give it a thorough watering; then withhold water for a week or so, but give the foliage a daily sprinkling or syringing. When the plant begins to show signs of new growth give more water round the roots, meantime keeping it in a shady place and not too warm. If it requires trimming into shape cut it back before new wood begins to form. As soon as it becomes established in the new pot keep it where it will get an abundance of light and fresh air. Do not let it lack for water, and as soon as the weather is warm enough in spring it may be plunged into the shrubbery border or some place near the house where it will be in partial shade during the heat of the day, and where it may be easily cared for. Take it into the house again just before freezing weather, keep it cool until you are ready to force it into flower again, and then give a little more heat and moisture. Apply liquid manure or nitrate of soda as the buds begin to swell.

Araucarias, Begonias, and Cyclamens

The Araucaria, or Norfolk Island Pine, has become a favorite Christmas plant. This is as often killed by over-care as is the azalea by neglect. When it comes to you at Christmas, instead of being at the height of its season of active growth, like the azalea, it is at the middle of its natural dormant period. Instead of the high temperature and abundance of water that are usually given, it should be kept in as cool a position as possible and watered very

sparingly. Early in spring it may be plunged into the ground out of doors. This is the time to repot it if repotting is necessary. Use a soil of half loam and half leaf mold and sand mixed together. A handful of unleached wood ashes will be beneficial.

The beautiful Lorraine begonia frequently coaxes the dollar out of the pocket of the Christmas shopper. Unfortunately it is not well suited to house conditions, but if you have one do the best you can with it. This plant should remain in flower for a long time. See that it has plenty of water, is protected from sudden changes in temperature and from gas, and is kept in a room where the air is as moist as possible. Many of the other begonias make ideal plants for growing in the house, and when well flowered are unsurpassed as Christmas gifts.

A well-flowered cyclamen vies with the azalea in profusion and beauty of bloom, and it may be kept without much trouble from year to year, increasing in size and beauty. If it is just beginning to bloom it should continue to send out buds and flowers for a long time. The plants of this kind sold at Christmas are usually twelve to fourteen months old from seed, and are having their first crop of flowers. Keep them very cool—as low as fifty degrees at night will not hurt—well supplied with water, and watch them carefully for the green fly. When the crop of flowers seems exhausted and the leaves begin to turn old and yellow gradually withhold the water and dry off the “bulbs” to give them a resting period before starting new growth preparatory to next season’s bloom. They may be kept in the pot or repotted in soil of the same character, but the so-called “bulbs” should not be allowed to dry out enough to shrivel. As soon as they show signs of making new growth, give more water and light. During the summer keep the plants outdoors in a cool, shady position, where they may be given plenty of water. Sprinkle tobacco dust freely to keep off aphids. As the new bud

stalks begin to form, occasional applications of liquid manure will add greatly to the strength of the plants.

Roses as House Plants

The dwarf roses make charming pot plants and are coming into more favor each year. A number of them are adapted to house culture and flower almost all the year round. A number of other roses are used for Christmas sale, but unless they happen to be of the very few varieties adapted to withstand the hardships of house culture there is not much hope of having them for another season's bloom indoors.

The greatest drawback to growing roses successfully in the house is the dry atmosphere. The plants must be kept clean by syringing the foliage frequently. Cold drafts or any sudden drops in temperature must be avoided, as these usually result in injury to the foliage through mildew. All the care needed by the dwarf roses is the cutting out of old flower spurs, an occasional repotting, and, for an abundance of bloom, the use once in a while of liquid manure, bone flour or wood ashes worked lightly into the top of the soil. In addition to the Baby Rambler, and several of the other "Baby" roses, La France, Hermosa, Agrippina, Clothilde Soupert and Maman Cochet, both white and pink, may with care be grown in the house.

One way of handling roses is to cut back the old wood quite severely when they are through blooming, and to keep them rather dry and cool so they will remain dormant during summer. In early fall start them into growth and take them into the house as cold weather approaches; or they may be plunged into the ground outside and allowed to grow through the summer until the leaves drop. Then they should be put where they may be brought into the living-room and given heat and water when desired. Slight freezing in the meantime will not hurt them, but it is better to keep them in boxes rather than in pots, both because the earth may be maintained in a more even state of moisture, and because there is no danger of boxes cracking in case of a freeze.

Callas, Ferns, and Daisies

Most of the many bulbs forced into flower for Christmas are of no further use in the house after we have done what we can to prolong their blossoming season. The old favorite callas, however, are an exception to this rule. They are rank feeders and appreciate frequent applications of liquid manure, but are not otherwise exacting in their demands so long as they have plenty of sunlight and water and are kept free from green aphids. The more sunshine and heat they can get the better they will like it. Dry off gradually, and let the bulb rest during the summer by turning the pot on its side in some shaded spot and leaving it there until about August. Then start it into growth again, repotting it first in soil that is about a third well-rotted manure, preferably cow manure.

The various ferns, which also are very popular as Christmas gifts, are particularly satisfactory in positions where full sunlight cannot be given. They do best in comparatively cool rooms, and do not require very frequent watering during the winter months. They should be watched carefully, however, and not allowed to dry out, as they may be considerably damaged before the foliage begins to show it.

A number of the daisies and the Jerusalem cherry are used quite extensively as Christmas plants. Though not so beautiful as some of the foregoing, they are very bright and attractive and with any sort of care will thrive, even when the temperature occasionally drops quite low.

Shrubs to Add Winter Beauty to the Place

Though no transplanting and setting out of shrubs may be done at this season of the year, there is no other time so good for selecting shrubs to give life and color to your winter landscape. If possible visit some nursery, where

you can compare the various things that are valuable for winter foliage, berries or bark, and plan a selection to meet your own requirements.

The various evergreens, low and tall, command first attention. Green, golden and silvery foliage can be had in the retinispora, thuja and juniper, and in the taller pine, hemlock and spruce. The red Siberian dogwood is one of the most showy of all the colored-bark shrubs. The willow family has a number of members with attractive yellow bark, including some of the common native sorts. And our beautiful native birches are in many localities free for the taking.

Among the winter berried shrubs are the barberry, snow-berry, Indian currant, rugosa rose, viburnum and euonymus, to mention a half dozen of the best. None of these things is expensive, with the exception of some of the evergreens. A little planning now, and a few dollars invested next spring or fall, will enable you to add permanently to the winter beauty and attractiveness of your place.

December: Fourth Week

STARTING PLANTS FOR NEXT SUMMER'S FLOWER GARDEN: HOW TO MAKE AND ROOT CUTTINGS; POTTING AND CARE

About the turn of the year you must begin to take thought for a supply of plants for next summer's flower garden. The chief advantage of growing one's own plants is the fun of doing it. In addition, there is the pleasure of being able to perpetuate some favorite flower that cannot be duplicated when one buys plants in the spring. In a very limited amount of space it is possible to start plants which, if bought in the bedding season, would cost several dollars.

Select such of your own plants as you care to propagate. To start a couple of hundred plants takes little room, for they may be placed, at first, about as close together as you can pack them. Do not, however, be tempted to start more than you can care for properly afterward, for each cutting after it is rooted will have to be given at least four square inches of room, whether it is placed in a pot or in a flat; and within a few more weeks it will need twice as much room. By the time the second shift is required, however, some of the plants can usually be put into a hot-bed or a cold-frame or placed in sunny windows, as there will be little danger of their being pinched by extremely cold nights.

If your plants are in the right condition your cuttings may be prepared at any time and rooted at once. Often, however, it is desirable to start the plants into more active growth before the cuttings are taken. Plants of all kinds require a resting period or vacation some time during the year. During this period growth is checked. Softwood cuttings from plants in this condition are not so likely to root readily as cuttings from plants in active growth. It is

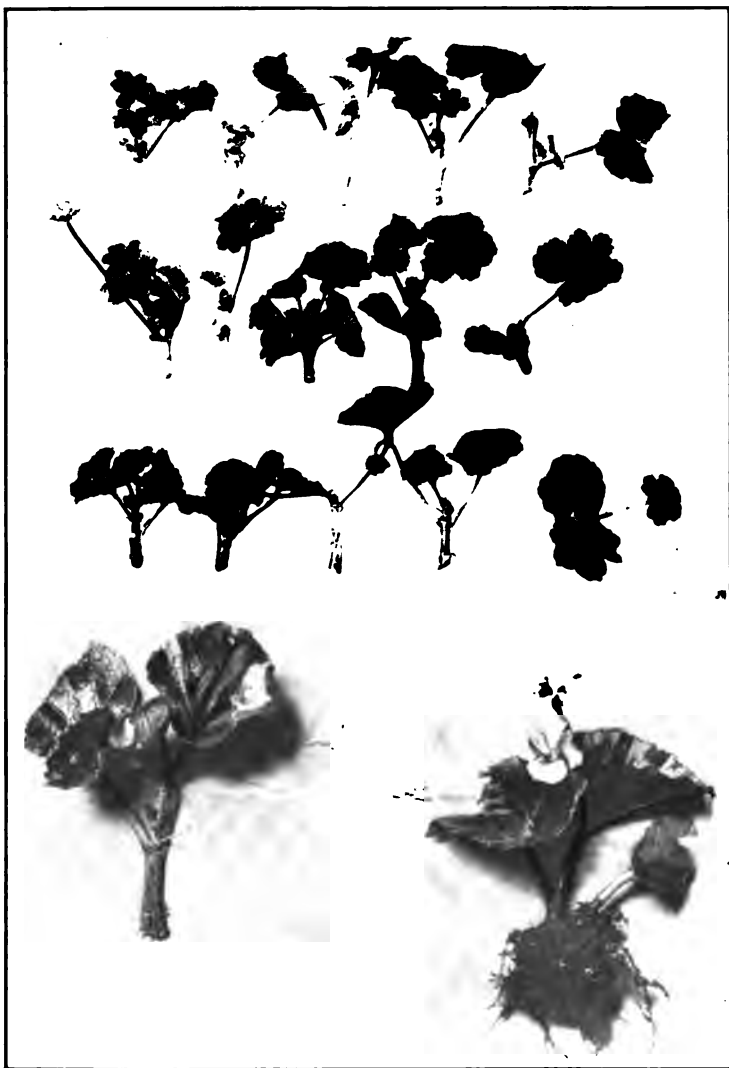


PLATE 30.—Here is a batch of fifteen geranium cuttings obtained from the two plants shown in plate 31 opposite page 337. A second lot was ready a few weeks later. (*Lower*) Two begonia cuttings. The one at the left has just begun to throw out its new roots and is ready to pot up. That on the right has been left in the cutting bed rather too long, and many of the roots had to be broken off in taking it up. Try to pot up your cuttings before the new roots get over half an inch in length.



PLATE 31.—(Left) Geranium plants after blooming through the winter ready to be "cut back" to make new growth in spring. (Right) The same plants after being cut back. After the new growth starts, the one to the right should be headed back still farther to form a compact, low plant. Failure to do this the previous year has made it tall and scrawny.

best, therefore, before taking cuttings to start up into active growth any plants that may be resting. This is accomplished, of course, by giving them more water and warmth and a little fertilizer, and by repotting, if that is required. Abnormal conditions, such as too much heat or too much stimulation, should, however, be avoided, as new growth that is soft, watery and weak is just as worthless as that which is too old.

The wood where the cutting is to be taken should be plump and firm, but not hard. Of course the degree of firmness varies in different plants. In a coleus or a snapdragon it may be comparatively soft, while in a geranium it is much harder.

The Snapping Test

You can determine when wood is in the right condition by applying the snapping test. This consists simply of bending the branch or shoot between the thumb and fingers to a right angle. If the wood snaps, but does not break clear off, it is in the right condition. If it merely bends it is too young or soft. If the bark cracks, but the interior fibers do not part, it is too old and tough. Often all three conditions of wood may be found on the same shoot, the tip being too soft and the lower joints too hard, while the middle is in just the proper condition to make one or more cuttings.

As one of the most effective methods of starting plants into active new growth is pruning or cutting them back, you can often get a small supply of cuttings from the ripened but not hardened terminal shoots or branches of the plants that are cut back, and a second supply a few weeks later when the plants brought into active growth have produced new supplies of wood suitable for the purpose.

This plan is especially good when space is limited during the early spring months. Some plants will be in bloom ready to set out at the beginning of the bedding season; others will come out and bloom freely during the latter part of the summer and early fall; and still others, which should

be kept disbudded in summer, will bloom inside during the fall and winter.

The operation of making the cuttings is very simple. Use a sharp knife, so that it will make a clean, neat cut, leaving no bruises or ragged edges. The cuttings should be made, for most kinds of plants, from two to four or five inches long. If the wood is in the right condition several may be made from the same branch. The cutting may be taken off just below a joint or between the joints, depending on where the wood is the best. If it is cut off slightly slanting the slip may be more readily pushed down into the sand, but it will root just as well if cut straight across. The leaves should be removed from the lower part of the cutting, and those near the top, if large, should be cut back about half. This is to lessen the possibility of their wilting, which should be guarded against while the cutting is forming new roots. Cuttings or slips are sometimes broken off, instead of cut off, and though they frequently root, this is not so sure a method as the other. In early summer, when conditions are favorable, whole branches of geraniums that have been accidentally broken off may be rooted by simply sticking them into the moist soil of the bed out-of-doors. After cuttings have been made they may be kept a reasonable length of time before being used, but they should not be exposed to hot sunshine or allowed to become dry. If they are wilted badly when ready to be used they may be revived by allowing them to soak in clear, cold water.

If the plants from which the cuttings are taken are infested with insects or scale of any kind get the cuttings absolutely clean before you attempt to root them. This may be accomplished by dipping them quickly several times in water heated to about 150 degrees, or by rinsing them in a nicotine spray solution, and rinsing them afterward, in either case, in clear, cold water. As a rule, however, cuttings should be taken only from perfectly healthy plants in vigorous condition of growth.

Starting the Cuttings

The cuttings may be rooted in any of several ways. A room or place where a fairly even temperature may be maintained is necessary. Plants that start in a moderate temperature are more likely to be healthy and vigorous than those grown in a very warm place. The temperature should if possible be kept up to forty or forty-five degrees, though frequently cuttings will take root when the temperature drops occasionally to very near freezing during the process.

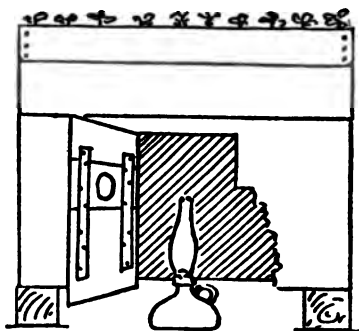
The material in which to keep the cuttings until the new roots form may be sand, sand and water, or pure water. The former is generally used, though the second, which is known as the saucer system, may sometimes be used to advantage when only one or two dozen cuttings are to be made. If sand is to be used procure an ordinary flat or shallow box, two or three inches deep. If the bottom is very tight, bore half a dozen holes in it. In this place a layer of coarse chip dirt or excelsior from the woodshed and then put in two inches of clean, medium coarse sand, such as masons use. Dirty sand may be cleansed in a few minutes by placing it in a pail and shoving a piece of hose through to the bottom, letting the water carry the impurities off from the top. After thoroughly saturating the sand, let it drain to remove all surplus water, and then place the cuttings to about half their depth in it, seeing that the sand is packed firmly and closely about them. Do not leave them in a wabby state.

By the second, or saucer, method, the sand is placed in a shallow glazed bowl or dish and kept wet enough so that water stands upon the surface all the time. The dish is placed in a warm window in the full sunlight, and the sand is kept constantly saturated, which will require the addition of a small amount of water each day. If the sand once dries out the cuttings are lost.

Some plants, such as the oleander, that have comparatively hard wood and are slow in rooting, may be made into long cuttings and stuck into a bottle of water into which

a few small pieces of charcoal have been dropped to keep it pure. One or the other of the foregoing methods is, however, usually more satisfactory.

For several days after the cuttings are put into the sand they should be kept shaded during the hottest part of the day. If they show any tendency to wilt give them an occasional sprinkling with a plant sprinkler or, if that is not at hand, with a clothes sprinkler or a wet whisk broom.



The sand itself, however, will not need another watering for some days—not until it begins to dry out on the surface. The ends of the cuttings callus over before any roots become visible, and during this stage the cuttings are likely to rot if the sand is kept too moist.

If possible give the cuttings box bottom heat. Set it up on two or three blocks or bricks on a radiator, or support it over a register. If neither of these is possible a simple propagating arrangement may easily be made as follows: Line a cracker box (A) with cheap tin, or old metal roofing, cutting in the bottom a number of large holes with an auger or with an expansive bit. To this bottom nail a six-inch section of another cracker box or a shallow cooky box (B). Cut a section from one side of the whole box for a door (C), holding it in place with leather straps or cheap hinges. Make this door large enough to admit an ordinary hand lamp (D) or a small oil stove so that it can be put in and taken out conveniently. Bore a small hole in the door so you can see the flame of the lamp when it is in place.

This apparatus, with reasonable care, will be perfectly safe and will not require attention frequently. If the lamp seems to heat the tin above it too much, the shallow box may be raised to any desired height on blocks. The cuttings box, which should of course be of the same size as the others, should be placed on top of the second box. The mild bottom heat secured in this way will greatly facilitate the rapid rooting of the cuttings. If two flats of cuttings are to be rooted they may be set crossways of the box and any warm-blooded cuttings, such as heliotrope, salvia or coleus may be placed in the middle.

When the cuttings are rooted, which will usually be in two to four weeks, they should be taken from the sand and put into pots or into other flats. Do not let the roots get very long—a quarter of an inch is long enough. If room is very scarce set the plants in a flat. Fill this with fairly rich earth containing a good proportion of sand, and see that it is well drained. Plant the little rooted cuttings in this, about two inches apart each way, shading them for a few days from the hot sun, and watering them sparingly until after they have become established. Or they may be put singly into two or two-and-a-half inch pots, or several cuttings may be placed in a four or five inch pot; in the latter case, plant your cuttings near the edge of the pot, and be very careful about overwatering.

Buy Some Novelties Now

If you want to keep your flower garden up to date you will be interested in trying several of the best of the novelties that appear from time to time. Now is the proper time of the year to get at low prices some of the fine new things that are offered. You will have to get smaller plants than if you waited until the bedding season, but there is ample time to grow them into good-sized plants before they should be set out. Space in greenhouse, hot-bed or warm window, and a supply of pots and soil, are the only requisites.

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